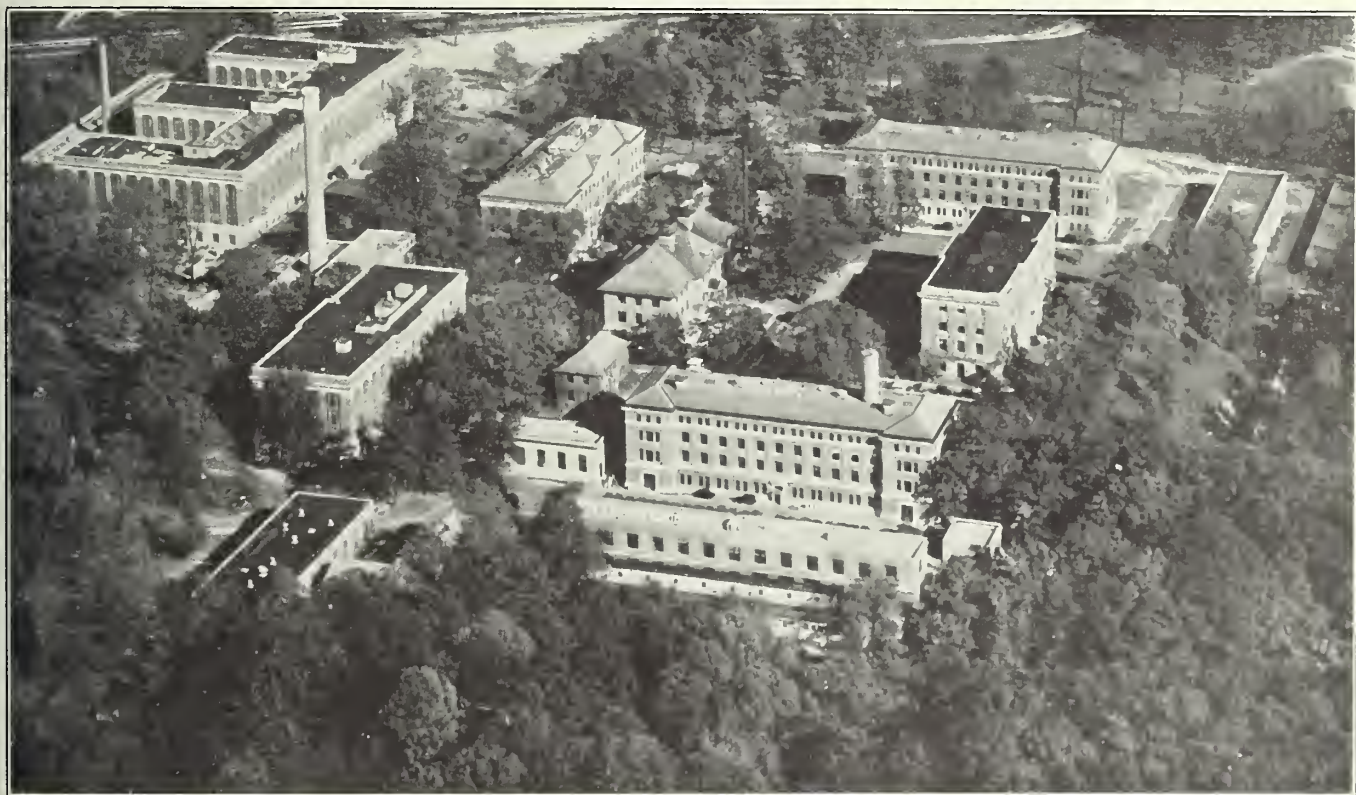


COMMERCIAL STANDARDS MONTHLY



*A Review of Progress in
Commercial Standardization and Simplification*



AIRPLANE VIEW OF NATIONAL BUREAU OF STANDARDS

ISSUED BY THE NATIONAL BUREAU OF STANDARDS OF THE
UNITED STATES DEPARTMENT OF COMMERCE, WASHINGTON, D.C., U.S.A.

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U. S. DEPARTMENT OF COMMERCE

R. P. LAMONT, Secretary

NATIONAL BUREAU OF STANDARDS

GEORGE K. BURGESS, Director

COMMERCIAL STANDARDS MONTHLY

S. F. TILLMAN, Editor

DIVISIONS OF THE COMMERCIAL STANDARDIZATION GROUP

DIVISION OF SIMPLIFIED PRACTICE, EDWIN W. ELY.

The division of simplified practice was formed in November, 1921, to provide a clearing house or centralizing agency through which the manufacturer, distributor, and consumer groups could meet to discuss their common problems and decide upon eliminations which would prove of mutual benefit to all concerned. The activities of the division are purely cooperative in character. It orders nothing; it dictates nothing; the initiative must come from business itself. It has no regulatory nor police powers to enforce adherence to the simplified-practice recommendations that industry develops under the auspices of the United States Department of Commerce. Its chief function is to serve as a neutral meeting ground for the purpose of bringing together producers, distributors, and consumers, whose aims are sometimes divergent and possibly antagonistic, and who would be unwilling to cooperate, except through some unbiased central agency. Following the approval of the tentative simplified-practice recommendation by a general conference of all interested elements thereof, the project is then presented to the entire industry by letter referendum for its approval and written acceptance, the publication and indorsement of the recommendation on the part of the Department of Commerce being dependent upon acceptance of the program by at least 80 per cent, by volume, of the manufacturers, distributors, and users concerned.

BUILDING AND HOUSING DIVISION, J. S. TAYLOR.

The division of building and housing cooperates with business, technical, and professional groups in practically all its undertakings on building and housing. Its work to modernize building codes and to encourage improved standards for the quality of building construction promotes the practical application of the latest development in design and use of building materials. This division was also formed in 1921.

In furthering home ownership, an effort is made to develop an enlarged, steadier, more intelligent, and more discriminating demand for soundly built dwellings, the largest single class of the buildings which the construction industries provide. The division also cooperates with many business and professional groups in efforts to distribute building activity more evenly throughout the year, and to secure less fluctuation from year to year. The work on city planning and zoning has in mind the broad objective of buildings made more useful because well located with respect to other buildings, a well-coordinated street system, and appropriate public works. Good city planning and zoning likewise encourages stability in land values and property uses, and thereby contributes to the demand for durable structures.

DIVISION OF SPECIFICATIONS, A. S. McALLISTER.

The duties of the division of specifications are to promote and facilitate the use and unification of specifications. In doing so it carries on activities involving cooperation with technical societies; trade associations; Federal, State, and municipal Government specifications making and using agencies; producers, distributors, and consumers; and testing and research laboratories. The cooperation with technical societies and trade associations includes ascertaining the standardization and specification promoting activities of these organizations, and bringing to their attention the work being done by the commercial standardization group. The cooperation with governmental agencies and other consumers includes the bringing of Federal specifications and commercial standards to the attention of the maximum number of producers and the maximum number of users of commodities complying with these specifications and standards, thereby assisting in broadening the field of supply. The cooperation with producers involves the compilation and distribution of lists of manufacturers who have expressed their willingness to certify to purchasers, upon request, that material supplied by them on contracts based on certain Federal specifications or commercial standards comply with the requirements thereof. The cooperation with distributors involves bringing to their attention the benefits to be derived by them as both buyers and sellers from handling nationally specified, certified, and labeled commodities. The division prepares the directories of governmental and nongovernmental testing laboratories; the Directory of Specifications; and is working on an encyclopedia of specifications, the first volume of which, Standards and Specifications in the Wood-Using Industries, has been issued. It also aids in preparing the Standards Yearbook.

DIVISION OF TRADE STANDARDS, I. J. FAIRCHILD.

The commercial standards unit, now known as division of trade standards, was created on October 1, 1927, for the purpose of aiding those industrial and commercial groups desiring to establish standards of grades, quality, or measurements for their products or their purchases on a purely voluntary basis.

The division functions only at the direct request of the industry concerned. Its procedure is similar to that of the division of simplified practice, except that at least 65 per cent of the industry, by volume of annual production, must accept the commercial standard in writing before it is published by the Department of Commerce. A certification plan is applied on request as a means of increasing the effectiveness of such standards. Provision is made for regular revision of the standard through the appointment of a standing committee to consider periodically any necessity for revision of the standard, in order that it may be kept constantly compatible with progress in the industry.

Except where otherwise indicated, for further information address

BUREAU OF STANDARDS

WASHINGTON, D. C.

COMMERCIAL STANDARDS MONTHLY

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VOLUME 6

WASHINGTON, D. C., APRIL, 1930

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AN INVITATION TO VISIT THE BUREAU OF STANDARDS

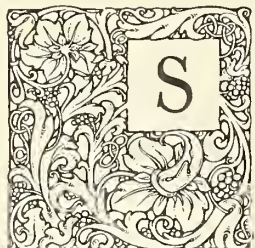
An interesting fact in the growth of the bureau is the steady increase in the number of visitors. From all over the world experts come to see the work in progress in many specialties. Not alone the experts but in growing numbers many of our people visit the bureau from a public-spirited desire to acquaint themselves with its research work. All visitors, from the newspapermen, who have called the bureau a "house of wonders," to the specialists, who use its services, are welcome, for it is their bureau in a very real sense. They are the owners of the business and its beneficiaries. The annual per capita cost of 2 cents which the average citizen pays toward the operation of the bureau yields returns sometimes a hundredfold or a thousandfold. How science turns wastes into profits, increases the useful life of materials, adds new efficiencies to industry, advances new arts, such as aviation and radio, by research and discovery—these are to be seen first-hand in the scientific and technical laboratories of the bureau.

A cordial invitation is extended to all citizens interested in scientific progress to visit the laboratories of the Bureau of Standards when in Washington. A personally conducted trip is organized at 2.15 p. m. daily except on holidays. Special trips for groups may be arranged at other times by writing to the bureau in advance. The bureau's illustrated Visitor's Manual may be had for the asking. This lists the work in progress and gives an airplane view of the ensemble and a brief statement of typical discoveries and inventions which have been notable, basic contributions to radio, aviation, and other modern arts and industries.

GEORGE K. BURGESS, *Director.*

THE VALUE of SAFETY CODES

*Accident Prevention Promoted Through
the Establishment of Safety Codes*



SAFETY CODES deal with all three methods of eliminating accidents, that is, design of plant, mechanical safeguarding, and operating practices. Accident prevention may be greatly promoted by both employers and employees and there are a number of voluntary agencies interested in this work, such as the National Safety Council and the American Association for Labor Legislation. It has been found necessary, however, for the State government to step in and exercise supervisory control over industrial establishments in order to achieve the best results, especially in the smaller plants which do not have an internal safety organization.

The principal activity by which State officials can reduce accidents is the inspection of factories and other work places with insistence that they shall be so constructed and operated as to provide for the safety and health of employees. In making such inspections, the inspector needs some standard of comparison by which to judge of the conditions which he encounters. For different inspectors to treat different cases upon a uniform basis it is necessary to have established standards subject to change only by definite action of the administrative authority and capable of being known to factory managers, manufacturers of machinery, employees, and others concerned with them before installations are made. It is then possible for such persons to plan their installations so as to meet the requirements of the State officials. It is also possible for casualty insurance inspectors and State inspectors to make uniform rulings.

Whatever legal form the regulations may take, it is desirable that they be as definite as possible, drawn up so as to be easily understood, available in printed form for the guidance of all concerned, and given very thorough consideration by all parties interested, before their mandatory adoption. Such a code of safety rules is valuable not only for mandatory enforcement by administrative authorities and for authorized inspectors, but as a guide to the industry in improving its methods and modifying its previous practices. Many manufacturers are glad to make improvements in the physical condition of their plants when the possibility of such improvements is pointed out to them, and many of them are eager to apply any information which will improve the welfare of their employees.

JOINT STANDARDS AGENCY FOR ELECTRICAL INDUSTRY

American Institute of Electrical Engineers Has Approved Formation of Joint Agency of Electrical Industry for Development of Standards

By HAROLD B. SMITH, *President, American Institute of Electrical Engineers*

At the meeting of the board of directors held January 29, important action was taken concerning the standards work of the institute. This matter is of so much importance that the attention of members should be called to it at this initial stage of the movement to invite their thoughtful consideration. The resolutions adopted by the directors follow:

The American Institute of Electrical Engineers, recognizing that other organizations in the electrical industry have the same fundamental interest in electrical standardization as the A. I. E. E., namely, aiding in and guiding the proper development of the electrical industry in the United States, *hereby resolves*: That the American Institute of Electrical Engineers approves in principle the formation of a joint agency of the electrical industry for the purpose of carrying out the necessary standardization activities of that industry. It is contemplated that this agency shall have three distinct functions: (a) The Electrical Standards Committee of the Electrical Industry in the United States of America. (b) The Electrical Advisory Committee of the American Standards Association. (c) The United States National Committee of the International Electrotechnical Commission and of any other international organizations for the handling of electrical matters. *Resolves*: That the president of the American Institute of Electrical Engineers is hereby authorized to take appropriate steps to propose this action to the interested electrical associations, preferably through the Electrical Advisory Committee of the American Standards Association. *And further resolves*: That the institute declares it to be its intention that on the consummation of an organization satisfactory to the institute for this purpose, the institute, in general, will refer to that body the consideration and approval of standards in which it is interested.

Proposed action initial step.

It will be noted that the only step taken at this time is to propose and indorse a contemplated and appropriate action. If the proposal is favorably considered by other electrical associations, an organizing committee will be formed which will determine the character and powers of the proposed industry standards committee. Consequently details are not involved at present and the only purpose at this time is to call attention to the general situation and to present some of the reasons that led the directors to take this initial step.

Conditions in the electrical standards field have changed greatly during the past 10 or 15 years. In the early years of standards activity the institute was the only organization active in preparing electrical standards. There was a need which the institute recognized and filled acceptably. In the international field, when the International Electrotechnical Commission was formed, the institute also became responsible for the United States National Committee.

Mainly during the past 10 years commercial associations and the United States Government have developed active interest in standards. The American Standards Association has been formed and expanded and the United States Committee of the International Electrotechnical Commission has been made autonomous. In both these latter developments the institute has had a major responsibility. As a result of these changes many new interests have been developed in the standards field and these interests have overlapped and jurisdictional difficulties have arisen.

"Standard" implies single authority.

The word "standard" implies a single authority to set up standards. With many bodies in the electrical field setting up standards, more or less independently, there has been unnecessary duplication of effort, unnecessary expenditures of time and money, and, in some instances, a defeat of the very purpose of establishing a common standard.

The organization of the American Engineering Standards Committee 12 years ago was a forward step for which the American Institute of Electrical Engineers was largely responsible. It has occupied a part of the field above that now under consideration. The foundation of its work has been the standards of organizations, such as the institute. The American Engineering Standards Committee and its successor, the American Standards Association, starts where the electrical organizations stop. It has been able to do little (by reason of constitutional limits) to eliminate duplication and jurisdictional difficulties among its member associations. As existing American Institute of Electrical Engineers standards are submitted to the American Standards Association (the successor of the American Engineering Standards Committee), and sectional committees are formed, the revision of such American standards pass automatically from the American Institute of Electrical Engineers' Standards Committee to the sectional committees of the American Standards Association. Gradually, then, standards work in established fields is passing to the committees established by American Standards Association procedure. In new fields, the present confusion will continue in spite of anything the American Standards Association can be expected to do.

The increase in number of American associations interested in standard work has also complicated the work of the United States Committee of the International Electrotechnical Commission. The relations between this international standards body and the American Standards Association has also presented difficulties of an organization nature. With so many associations having a voice, how can the United States Committee of the International Electrotechnical Commission determine the American position on any question? This situation has been very humiliating to American delegates to International Electrotechnical Commission meetings and American influence and interests have suffered.

Movement benefits industry and institute.

The broad purpose of this movement, which the institute has indorsed, is to unify standards effort in the electrical field, nationally and internationally. The directors believe there exists an opportunity for the institute to again serve the industry and the profession by contributing the experience and the facilities of the institute to this cooperating effort. If this movement succeeds, both the industry and the institute will benefit.

VALUE OF AMERICAN MARINE STANDARDS TO THE SHIPBUILDING INDUSTRY

Standards for Ships' Parts and Marine Equipment Insure Greater Interchangeability, Ease of Replacement, and Economical Production—Shipping Board Makes Use of American Marine Standards—Their Use Is Optional

Col. E. A. SIMMONS, *American Marine Standards Committee*

In applying the principles of standardization to shipbuilding, the American Marine Standards Committee, which was organized seven years ago by the marine industries themselves to simplify practice and reduce the cost of building and operating ships, is carrying out what is, perhaps, the most important and beneficial project now going on in the practical side of shipbuilding.

High prices of materials and labor in the United States have prevented American shipbuilders from competing successfully with foreign shipyards in building vessels for overseas trade. This condition obviously calls for a united effort on the part of the shipbuilders to reduce the cost of shipbuilding in any practical way that will not impair the efficiency of the product. The work of the American Marine Standards Committee is a step in this direction that is proving increasingly effective as standard practices are agreed upon and adopted in the shipyards.

Up to the present time more than 100 American marine standards have been promulgated, approximately half of which relate to hull details, the remainder being about equally divided between engineering or machinery details and ship operation details and supplies. Except for the fact that the United States Shipping Board requires the use of these standards in all vessels built or reconditioned with aid of a Government loan, the use of the standards is in no way compulsory. They are issued as recommended practice and represent the best experience and thought of the industry itself, voluntarily given by individuals in an effort to improve the standards of practice in order that the industry as a whole may enjoy the benefits of safety and economy which will result from their adoption.

Membership controls.

The underlying governing power in the organization which was formed for carrying out this work, is vested in a membership enrolled from the various elements of the marine and allied industries. This membership is composed of member bodies constituted by the interests themselves and represented by the members designated by the member bodies. An executive board elected annually from and by the membership, appoints and controls the administrative officers and technical and special committees, directs the general policies, and outlines the technical working program. The administrative details devolve upon the chairman and the secretary, the latter being in effect the executive officer for all activities.

From the start the work of the American Marine Standards Committee has received the cooperation of the Department of Commerce, the United States Shipping Board, the War and Navy Departments, and all other branches of the Government concerned in any way with marine activities. At the time of

organization, the executive office was made a unit of the division of simplified practice of the National Bureau of Standards, and that arrangement is still in effect.

The work of the committee is handled by three main divisions, the first deals with hull details, the second with engineering or machinery details, and the third with ship-operation details and supplies. Recently a fourth division, covering port facilities, has been added. Each of these technical divisions is headed and supervised by a technical committee appointed by the executive board. These technical committees organize subject committees for the development of standards. The personnel of the technical and subject committees is drawn from the field at large and is not confined to the membership.

Periodicals reviewed for improvement.

One of the important functions of the committee is to review its publications from time to time with a view to their possible improvement and in order to keep abreast of developments in the industry and in the service requirements. Users of the standards are asked to cooperate in this by submitting constructive suggestions.

Many of the American marine standards are in agreement with the Navy's standards and have been put into practical use by the Bureau of Construction and Repair. They are being used wherever possible in ships built for the Coast Guard service and for the Coast and Geodetic Survey and are being widely adopted by the shipyards, naval architects, and ship owners in the building of merchant vessels.

In this work of standardizing shipbuilding practice no attempt is being made to standardize ships and their machinery as a whole. Ships of standard size and types were built in this country during the World War in order to meet an abnormal demand for producing the greatest number of ships in the shortest possible time. At that time all other considerations became secondary to speed and quantity of production. In peace times, however, the ordinary demands of commerce are not such as to warrant the production of ships on a strictly standardized or manufacturing basis except in special cases. Substantial reductions in cost of construction are possible where several sister ships are built in the same yard for the same service, but, in general, the requirements of individual owners are so diversified that they can not be met economically by the bulk production of stock ships.

Standard for ships' details.

While the standardization of vessels as a whole offers no advantage at present in this country, on account of the diversified character of the market for ships, standardization of ships' details, particularly of fittings and equipment, offers a distinct advantage to the shipbuilder as a means for simplifying practice

and saving time and money in production. And it is in this direction that the work of the American Marine Standards Committee has so far been chiefly directed.

The whole aim is the simplification and standardization of such parts of ships' equipment and outfit as are supplied in duplicate or quantity or which under ordinary conditions of operation are likely to call for more or less frequent replacement or repair. While the complete standardization of such parts might eventually be desirable and beneficial, the vital point so far as the shipbuilding industry is concerned is the unification of the connections of fittings to each other, or to the main structure of the vessel. The general characteristics of the fitting become of secondary importance provided its connection to the structure of the vessel or to other fittings conforms to a universally adopted standard. In this way the advantage is gained of the prompt availability of parts for repairs and renewals, the economy of which is apparent.

For portable fittings and equipment the problem of attachment is supplanted by that of stowage, and standardization of such equipment involves both dimensions and shapes. Material of this character is usually supplied more or less in quantity; its production involves manufacturing methods and the importance of reduction in numbers and variety in designs

and the standardization of sizes and shapes is correspondingly increased. In this direction standardization has its greatest and most obvious sphere of usefulness.

Interchangeability important.

Interchangeability is also an important asset in the standardization of ships' details, as standard fittings and equipment are usable on any vessel and delays in obtaining spare parts are materially reduced if not entirely eliminated. Incidentally, from the point of view of the shipowners, interchangeability of the personnel is equally important; for the crew of one ship can readily understand the operation of another ship if standardized equipment is installed.

The standardization of ships' details is not a new or novel departure for the shipbuilders. Hitherto each established yard has built up its own standards for the purpose of reducing the cost of construction in its own plant, but there has been no uniformity in the standards in the different yards, and, for this reason, they have failed to benefit the industry as a whole.

The creation of the American Marine Standards Committee has established a common ground on which differences are being reconciled and uniformity of practice attained to the mutual advantage of the shipbuilder and the shipowner.

SIMPLIFICATION NEWS

Following a conference held in Chicago in January, to consider the simplified practice recommendation covering sizes of fruit and vegetable cans, the National Cannery Association has taken initial steps looking toward a second survey among their members to obtain additional data which may result in a further elimination of the sizes of cans. The Bureau of Standards is cooperating in this survey. It is expected that this survey will be completed by May in order that the data which is acquired may be submitted to the May meeting of the board of directors of the National Cannery Association.

The national survey of wrapping and packing methods and supplies which the Bureau of Standards is carrying on in cooperation with the National Retail Dry Goods Association was actually started on March 15.

The National Association of Purchasing Agents, at the meeting of their executive board in New Orleans in February, took initial steps looking toward the appointment of a committee to represent the large buyers of steel office equipment. The purpose of this committee will be to make recommendations to the manufacturers through the division of simplified practice.

Recent meetings of standing committees, representing different branches of the chinaware industry reaffirmed the following recommendations: S. P. R. No. 5,

hotel chinaware; S. P. R. No. 33, cafeteria and restaurant chinaware; S. P. R. No. 39, dining-car chinaware; and S. P. R. No. 40, hospital chinaware. The present schedule will continue in force without change for another year.

At a general conference held in New York on February 6, a simplified schedule covering the sizes and classifications for inflated rubber toy balls was approved. The list of sizes applies to mold diameters in which these balls are formed, and includes allowances for oversizes as manufacturing tolerances. Manufacturers and distributors are now being circularized for acceptances of this program and later announcement will be made of the results of this circularization.

A general conference of manufacturers, distributors, and users of dental hypodermic needles was held on June 17, 1929, at White Sulphur Springs, W. Va., in conjunction with the annual meeting of the American Dental Trade Association and unanimously adopted a simplified schedule for this commodity. The program establishes as stock varieties, the gages and lengths of different types of needles used by the dental profession, and lists the material from which these needles are made. The program was developed by the simplification and standardization committee of the American Dental Trade Association, as one of a series of simplification programs in the dental supply field.

NEED FOR STANDARDIZATION IN ROAD BUILDING

Committee of Road Builders to Study Need for Standard Working Equipment and Specifications for Grading Methods

By LYLE A. BROOKOVER, American Road Builders Association

Reduction of the cost of grading operations, which is the first step in road building, is the ultimate aim of an investigation of grading methods and grading equipment which has been undertaken by a committee of the American Road Builders Association. Another result of the year's survey doubtless will be the submission to the road building industry of standard specifications for grading methods and recommendation of standard equipment with which to do the work.

The committee, of which B. E. Grey, State maintenance engineer, West Virginia department of highways, is chairman, is made up of engineers, highway educators in universities, contractors, editors from the technical press, and representatives from several manufacturers of grading equipment. P. F. Seward, of the American Road Builders Association, has been assigned to the committee as a special investigator.

The first investigation probably will have to do with the construction of embankments. This item is of vital interest to all arms of the highway industry, and represents a field in which a thorough investigation will be most timely. The first thing that impresses anyone studying a digest of specifications as to grading methods is the wide variation of practice governing the simplest phases of the work.

Need of uniformity.

To be sure, one can understand readily enough that conditions in Colorado are different from those prevailing in Florida, and that possibly there is a proper reason for different classifications of excavation pavement for slides, and overbreakage, but when two adjoining States doing work in practically the same formation call in one instance for classified excavation and in the other for unclassified, and in one instance do not allow any extras, while in another, allowance is made under certain restrictions, it is obvious that either one or the other, or both, are somewhat in error in their requirements.

Why should one State require solid rock excavation to be made 6 inches below the subgrade, another 8, another 10, another 12, and still another 24. To be sure, various depths might be required because of frost action, but the difference between States is not based upon any such distinction, as, for instance, Louisiana calls for 12 inches while Maine specifies only 4 inches. Certainly the pavement construction is practically the same no matter what the geographic location in this respect.

For another instance, one State provides a free haul limit of 300 feet, another 500, a third 1,000, a fourth of 2,000, and still another of 5,000. Obviously these can not all be justified by variation of conditions, but rather have become established because some engineer back in the beginning of road construction chanced

to select a particular figure. In the method of placing embankments, certain States permit types of equipment which are prohibited in others. Some States require embankments to be placed in layers 8 inches in depth, others 1 foot, and others 2 feet. These specifications undoubtedly have come into being in the same way as the overhaul variations.

Variation of equipment.

With regard to equipment, we find again a large variation; different States requiring different types and weights of rollers, some insisting that fills be puddled, others being of the opinion that such methods are unnecessary, while still others insist upon jetting and sprinkling, or having a requirement for rolling with various special designs of roller wheels.

In every line of endeavor, it has been proven that the more nearly standard any operation becomes, the lower the unit cost. Road building has reached such a tremendous development that contractors work today not only in one county or one State, but over a number of States and even countries. It must be apparent that if a contractor keeps a record of his costs on any particular job in accordance with the requirements for that job, he has valuable information upon which to base his bid for the next piece of work under the same conditions.

Benefits from standardization.

From the foregoing it is evident that need for standardization exists in so far as such standards may be adapted to the variation in geographic conditions. Some of the benefits which may be expected to come from such standardization are as follows:

The State might well expect to receive lower bids if all other States had similar specifications for the same class of work. Any extra manipulation required is an extra item of cost, and if after a careful study some of these can be eliminated without injuring the finished work, lower costs, increased speed of construction, and a better understanding could be had all around.

For the contractor, the definite knowledge that for a given class of work, he would be required to follow the same procedure anywhere in the country. By having this standard, training of personnel to a higher degree of efficiency, and reduction in amount of equipment required would result.

For the manufacturer, a definite program of improvement along established equipment requirements could be had with the knowledge that various States would not be calling for special equipment of odd sizes or peculiar characteristics. Such knowledge would permit careful attention to volume production with subsequent reduction of unit costs, greater profits to the manufacturer, and at the same time show a saving to the contractor and the general public.

OVERDIVERSIFICATION IN MANUFACTURE MAY MEAN FAILURE

Lack of Standardization in Furniture Plant Almost Resulted in Bankruptcy—Standards for Designs Promote Economical Production

How the lack of standardization in a woodworking plant nearly forced the plant into bankruptcy, which was avoided only by a drastic change in policy, is described in a recent issue of the magazine, *Wood Worker*. A certain concern in the South, manufacturing high-grade dining-room furniture, was nearly forced into bankruptcy through failure of its superintendent to conduct the business in a systematic manner. A recent alteration in the managerial policy has resulted in a decided change for the better.

This concern manufactures a great and ever-changing variety of designs, and its previous methods of construction were devoid of anything like a standardization of parts or uniformity of basic dimensions. Because of the almost indefinite variety of styles produced it was thought impossible to establish any system of standardization, and as a result the parts left over from one lot of suites could not be utilized in any subsequent lot.

When the superintendent of this plant had run things on this plan until every nook and corner was filled with nonusable odds and ends of left overs, he began to do some hard thinking and came to the conclusion that it was time to alter his tactics.

Production systematized.

The upshot of it all was that a system was introduced whereby the width, depth, and height of each respective piece of furniture is always made the same, regardless of the special ornamentation in the way of turnings, molded edges of tops, face veneering and overlays which are used to differentiate one style from another. Thus the drawer sides, backs, and bottoms on each standard-size buffet are always the same, although there might be a difference in the veneering and ornamentation of the drawer fronts. The same

things applies to all the unit parts of each piece manufactured.

In addition to a vast saving in material, this system has greatly simplified the problem of production. All machining operations have been standardized, and as each unit produced is in all respects the same as items produced many times previously, the workmen acquire a high degree of efficiency. By utilizing the principles of standardization, this business has been lifted from chaos to system and success.

British have standards.

Another item bearing on standardization in woodworking industries is found in *Factory and Industrial Management* in an article, *A Leaf From British Practice*, by R. W. Reid, vice president of the Carriage and Wagon Works, London, Midland, and Scottish Railway Co., and F. J. H. Lemon, carriage and wagon superintendent of the same plant.

When it was first suggested that modern machining methods might be extended to woodwork, involving machining to size within close limits and inspection with limit gages, the reply was that wood would warp or shrink after machining, and assembly without hand fitting was impractical. Careful conversion, followed by thorough seasoning of the timber, has proved these fears groundless.

Standardization of design, the first step toward economical production, led to drafting of definite standards for vehicles required in railway traffic. And where such designs could be modified in order to increase the number of items dealt with by one machine at one setting, and so reduce the unit cost, this was done. Also the plant was laid out, as far as the existing shop buildings would allow, to effect a sequence of operations to reduce handling to a minimum.

HIGH TEMPERATURE INSULATION MATERIALS

Tentative final drafts of standard specifications for molded insulation coverings for temperatures over 550° F.; diatomaceous earth, granular, calcined; and insulating brick and mortar have been submitted to the membership and others concerned for comment and ballot vote.

The next meeting of the executive board has been set for April 18. It is expected that the results of the ballot votes on the above items will be available for report at that meeting.

UNIFORM OUTFITS FOR MERCHANT-MARINE OFFICERS

The American Marine Standards Committee has developed proposed standard specifications comprising a description of the uniform outfit, and of rank and corps insignia, for licensed, staff, and petty officers,

also specifications for blue uniforms, hot-weather uniforms, caps, overcoats, raincoats, buttons, and gold and silver lace, with an appendix on care of the uniform. The preliminary draft has been submitted to the membership and others interested for comment and ballot vote.

COMMERCIAL STANDARDS MONTHLY

The circulation of the *COMMERCIAL STANDARDS MONTHLY* has shown a decided increase since its initial appearance in July of this year. The figures are as follows:

July	887
August	1,041
September	1,197
October	1,426
November	1,609
December	2,008
January	2,626
February	3,068
March	3,457

NEW STANDARD FOR GRAY IRON CASTINGS

British Engineering Standards Now Based on Research Carried Out by British Cast Iron Research Association

Due principally to researches made under the auspices of the British Cast Iron Research Association, new British engineering standards have been issued covering test pieces for gray iron castings. In the past, it is to be feared that the use and interpretation of test coupons has been perfunctory and casual, because everyone connected with the design and production was aware that the mechanical properties varied appreciably with the thickness of the section; nevertheless one size of test bar did duty for everything from an engine bed plate to a small bell crank.

Research has made it quite clear that the average tensile strength of gray iron decreases, the thicker the sections, since the rate of cooling in the mold profoundly affects the solidified metal. This is particularly noticeable in large masses, the outside surfaces setting considerably before the inner metal. Consequently, there is a comparatively weak and spongy core encased within a harder shell.

Both tensile and transverse test pieces are now graded in cross section to suit the material they are intended to represent. For tensile tests there are three standard diameters to represent three distinct ranges of casting thickness. Disparities are thus reduced within narrow limits.

Three thicknesses and two grades.

For transverse tests, too, three sizes of circular bar are now made to serve for these three casting thickness ranges. Values for the breaking loads are also tabulated to accord not only with the nominal diameters but also with small casting variations therefrom. This is just as it ought to be, because bending stress varies inversely as the diameter cubed. Because metal in the casting crystallizes radially, this should favor the circular shape rather than rectangular bars for bending tests. Furthermore, square corners are a source of weakness, since they tend toward the formation of, always undesirable, cleavage planes. It is thus doubly appropriate that the test piece should more nearly approximate the condition enforced by correct design; that is, that liberal fillets and semicircular or well-rounded terminal contours be provided.

Briefly, the new provisions for the tensile test are as follows: A $\frac{7}{8}$ -inch diameter cast bar is turned in the

waist to 0.564 inch and this serves to represent castings up to and including $\frac{3}{4}$ -inch thick; a 1.2-inch cast bar is turned to 0.798 inch waist diameter to answer for casting thicknesses above $\frac{3}{4}$ and up to 2 inches, while for thicker pieces a 2.2-inch cast bar is turned to a waist diameter of 1.785 inches. In each case the gage points are a minimum of 2 inches apart. The minimum ultimate tensile strengths for these three bars are 12, 11, and 10 gross tons per square inch, respectively, for grade A material and 10 and 9 gross tons per square inch for grade C cast iron.

It may appear somewhat contradictory to machine the cast specimens to a considerably smaller diameter. It does sacrifice some of the strongest material, but it removes surface inequalities characteristic of a cast bar. Practical considerations enforce a compromise, and the balance probably gives a close approximation to the correct result.

Values specified for round transverse test bars.

Transverse test pieces nominally $\frac{7}{8}$ inch diameter, 15 inches long, to span supports 12 inches apart, are made for castings up to and including $\frac{3}{4}$ inch thick; 1.2 and 2.2-inch diameter bars, 21 inches long for 18-inch spans represent castings between $\frac{3}{4}$ inch and 2 inches and above 2 inches, respectively. Great pains have been taken in tabulating central loads and deflections for the three thicknesses and for both grades of iron, for diametrical variations in steps of plus and minus 0.05 inch. As illustrating the effect of plus or minus 0.10 inch in grade A material, a transverse bar 0.775 inch diameter must carry a minimum of 835 pounds, whereas the load for a bar 0.975 inch diameter reaches 1,620 pounds.

Modulus of rupture does not appear in the specification, but is a useful relative value. It also decreases as the casting thickness increases. The approved figures are: 54,000, 50,900 and 43,000 pounds per square inch in grade A iron; 43,900, 42,400, and 38,500 pounds per square inch for grade C iron corresponding to the three sizes of bar.

The specification permits the use of bars either cast on or cast separately, as the engineer may prefer. If the latter, it is stipulated that the bars must be poured at the same time from the same melt as the castings they represent.

FEDERAL SPECIFICATIONS NOW IN NEW FORM

First Specification Available in New Form Covers Automobile Tires

Federal specifications are now being printed in a revised form. The first specification to become available in the new size and form arrangement is that covering "Tires; automobile, pneumatic," which will become mandatory for all Federal Government pur-

chasing agencies on May 1, 1930. In the upper right-hand corner of the first page of the printed pamphlet appears the specification symbol used in the Federal Standard Stock Catalogue for the commodity. Copies of this Federal Specification ZZ-T-381 may be purchased from the Superintendent of Documents, Government Printing Office, Washington, D. C., for 5 cents per copy. At the same time it is of interest to note that an alphabetical index of Federal specifications may be obtained at a cost of 5 cents each, through the same agency.

SAVINGS THROUGH STANDARDIZATION OF CONCRETE BUILDING UNITS

Recent Survey of Program Indicates Potential Savings to Manufacturers, Retailers, and Builders Through Simplification of Unit Sizes for Block, Tile, and Brick

By J. F. McNEIL, *Division of Simplified Practice*

Now that the winter snows have melted and the frosts have left the ground, once again the familiar clamor of the steam shovel, the rumbling motor truck, the rattling concrete mixer, and the rat-a-tat-tat of the rivet hammer heralds the usual speeding up of spring-time construction work.

Because of the attention now directed toward construction it is of special interest to note the results of a recently completed survey among the acceptors of the simplified practice recommendation for concrete building units (block, tile, and brick). The benefits enumerated herein may inspire other industries to inaugurate similar simplification programs. At least, they should bring home to this particular industry the fact that the success of their simplified schedule depends upon continued adherence.

Simplification program studied.

The need for a simplification program for concrete building units was realized during 1922, and was forcefully brought to the attention of the members of the industry by several articles, which appeared in trade publications, expressing regret that nothing had been done to curb diversification.

In June of the following year, a subcommittee of Committee P-1 of the American Concrete Institute was appointed to study this problem and to decide upon a procedure which would result in the simplification of sizes. This subcommittee, at the invitation of the division of simplified practice, met at the Department of Commerce, Washington, D. C., on June 21, 1923, and discussed in general a proposed simplification program.

Meanwhile, a meeting of the concrete block and tile machinery manufacturers was arranged for July 30 and 31. Definite proposals for standard-sized concrete brick and blocks were made at this latter conference. The question of tile sizes was not considered then, but was held over for future discussion.

The recommended sizes of block, tile, and brick, which were submitted to the American Concrete Institute in convention, in February, 1924, were approved by that organization, and in turn were transmitted to the division of simplified practice.

Conference approves recommended sizes.

Conforming to the usual procedure of the division, a general conference of manufacturers, distributors,

and users was called for October 16, 1924, at Chicago, Ill. The findings of the Committee P-1 were used as a basis of discussion. The question of the size of mortar joint seemed to be an important factor to be decided, prior to the adoption of any standard sizes of building units and after much discussion, it was the consensus of opinion that certain sizes of concrete blocks be adopted with an allowance of sufficient tolerance to permit either the use of one-fourth or three-eighths inch mortar joint. The adoption of this tolerance changed the recommended sizes of these blocks as submitted by Committee P-1.

The recommended sizes for concrete building tile, as submitted by the above-mentioned committee, were unanimously approved. As these sizes pertain only to load-bearing wall tile, it was the consensus of opinion that the same sizes of standard-partition tile as agreed upon by the clay-tile industry would also meet the entire demand for concrete tile, and, upon vote, six sizes of partition tile were approved as standard.

The discussion on the sizes of concrete brick developed the fact that only one of the sizes as recommended by the committee was necessary. This size, therefore, was approved as standard.

It was further agreed that this recommendation should become effective from June 1, 1925. The division of simplified practice was also requested by the conference to circularize the entire industry for their written acceptance and to appoint a standing committee of the industry, the principal functions of which would be to maintain contact between the industry and the division and to determine the adequacy of the recommendation through annual review. These requests were accordingly fulfilled.

The recommendation as adopted was instrumental in effecting a reduction in variety from 115 sizes and types of concrete blocks, tile, and brick to 14, or approximately 85 per cent.

Recommendation reaffirmed.

At a meeting of the standing committee, held in February, 1927, it was unanimously decided to reaffirm the existing recommendation, without change, for another year commencing June 1, 1927.

A year later, at a meeting of the standing committee held March 1, 1928, the recommendation was again reaffirmed, without change, for another year.

Has simplification proven worth while?

Yes, say manufacturers, distributors, and consumers of commodities for which there have been established simplified-practice recommendations. To ascertain this opinion of industry the division of simplified practice conducts periodic surveys among the acceptors of the recommendations. The results of these surveys have appeared in narrative form in the *COMMERCIAL STANDARDS MONTHLY*. Due to numerous requests for copies of these surveys, the division has prepared a mimeographed supply which is available, upon request, without cost.

A survey of production covering the year 1927 was conducted under the auspices of the Portland Cement Association; 4,198 manufacturers of concrete block, tile, and brick, representing 90 per cent of the total production, and 85 per cent of the firms engaged in such production, contributed data which indicated that the average degree of adherence to the recommendation was 90 per cent.

Benefits derived.

Some time ago, a letter was sent to all accepters of this simplification program requesting that they evaluate the benefits and savings which were being derived from the application of this recommendation. Although few were able to estimate actual monetary savings, the following excerpts taken from replies to this survey indicate that much benefit is being derived from this waste elimination effort:

Savings to a New Jersey manufacturer during one year were estimated to be \$11,500. "I believe this amount to be about right," says the writer, "as there has been figured in the cost of extra machinery, molds, and other equipment that were necessary; for example, we once made a 4 and 8 inch block to put up a 12-inch wall, whereas now we make a 12-inch block which answers the same purpose and yet cuts down the manufacturing and handling on one unit."

Another large eastern manufacturer writes, "I believe it is one of the greatest of works done in recent years for the economy of construction. There is not a shadow of a doubt but that there is a great saving to the manufacturer, the retailer, and the ultimate buyer."

"Not only is there a monetary saving, but it is my opinion that service through this medium can be improved fully 25 per cent."

"Simplified practice in our plant has reduced the selling price of our product 25 per cent," replies a concrete block manufacturer of the Middle West. "We are still making a fair profit, selling more units and have created a larger demand for our products."

"It enables us to keep our block plant in operation during the entire year, affords steady employment to our workers, and helps greatly in getting a uniform production, therefore, keeping our cost at a minimum," writes the secretary of an Ohio fuel and supply company. "By having only the standard sizes in stock it reduces selling expense and gives us a quick turnover."

"By following the suggestions in regard to concrete blocks, reducing patterns, I have been able to reduce my stock more than 60 per cent," says a distributor, "and have actually increased my sales to the standard pattern and size 15 per cent. By doing this my block business shows a satisfactory profit, whereas before the excessive stock ate up all the profit."

A general contractor writes, "I am pleased to advise you that in the manufacture of concrete building units, the standardization of sizes has greatly simplified the industry and makes their building units more acceptable to the trade."

"Standardization of sizes has been a great boon to the concrete products industry," says the general manager of a large association. "Concrete machinery manufacturers, in the design of new equipment, have taken into account the sizes accepted by your division. Many products manufacturers have purchased mold boxes for old equipment that will enable them to produce standard size units."

Summary.

A brief résumé of the benefits accruing to the industry due to the application of the simplified practice program for concrete building units, as acknowledged in the foregoing excerpts, indicates them to be improved service, reduced stock, lower selling price, larger demand, stability of employment, uniform production, quicker turnover, and at the same time the units, in many instances, have become more acceptable to the trade.

Simplified Practice Recommendation No. 32, Concrete Building Units, may be obtained from the Superintendent of Documents, Government Printing Office, Washington, D. C., for 5 cents a copy.

WELDING RESEARCH BENEFICIAL

Satisfactory Welding for Building Construction; Offers Solution of Noise Problem

In order to help the construction industry obtain safe and economical structures, the National Bureau of Standards, in cooperation with the American Bridge Co., has carried on investigations on welded connections for use in steel-frame buildings. These included tests on column splices formed by welding plates to the inside faces of the column flanges. The connection was made by bolting splice plates to these welded plates. The tests showed that the connections were adequate in strength to carry the loads for which they were designed.

Welding offers a number of advantages over other methods of connecting the members of steel-frame buildings. One of these is the elimination of most of the noise which usually accompanies the erection of

steel buildings. Examples of buildings recently erected by welding with this advantage in view are the additions to the Homestead Hotel, Hot Springs, Va., and the Ohio Valley General Hospital, Wheeling, W. Va. While the elimination of noise is especially important in the construction of additions to buildings already occupied, freedom from noise in the congested business areas of the large cities is also highly desirable.

The use of welding will also reduce the cost of construction of many buildings. In comparatively simple buildings, the steel may be shipped from the rolling mill direct to the site for erection by welding without the need of the intermediate shop operations required by other methods of erection.

Savings may be effected by designing floor beams as continuous beams with a resulting decrease in the weight of steel required. Existing structures may often be remodeled or strengthened more economically by welding than by other methods.

QUALITY STANDARDS SOUGHT TO GUIDE CONSUMERS

Users Advised by Government Expert to Insist on Accurate Information on Quality of Goods Bought

RUTH O'BRIEN, *Bureau of Home Economics, Department of Agriculture*

Each generation brings its own problems to the home maker. I remember hearing my great-grandmother say that her greatest problem was keeping her six sons from the evil ways of the world. Considering that most of the time the family lived 12 miles from the nearest neighbor, that the only means of transportation was by foot or by horse, and that the struggling pioneer life demanded work from dawn to sunset, I can hardly see how there were many opportunities for evil contacts.

But when my great-granddaughter asks me what the greatest problem of the home maker was in my time, I shall say "purchasing." While great-grandmother also had to make purchases, the market to which she went contained relatively few different grades from which she had to choose, and she took with her an intimate knowledge of quality gained by having made many of the products herself in her own home. To-day the home maker is faced with hundreds of different commodities with which she has had little intimate experience, and has arrayed against her the pressure of a commercial world which is overproducing and whose experience depends upon persuading her to buy and then buy again.

The situation is especially complicated in connection with textiles. It is made extremely difficult by the large number of new fibers which have come on the market, the many new fabric finishes, some of which conceal lack of quality very effectively and the fact that many of the qualities which she is called upon to judge can not be determined by mere inspection at the counter.

Ways of judging textiles.

For many years we have been learning ways of judging textiles, and some of these methods do help in some cases. But suppose we are honest with ourselves for a few moments and think over what really happens when we approach a dry-goods counter to buy even as simple a thing as sheeting.

Usually the clerk shows us a number of different qualities. We pull them between our hands, try to look intelligent, and ask him a few questions. No matter how sincere he is, there is usually very little real information which he can give. The truth is that the textile merchandising situation is becoming so complicated that the retail buyers are having the same difficulties the consumers are. This is evidenced by the demand being made on the part of some for testing laboratories from which they may get help. And, of course, the average clerk knows much less than the buyer. When we carefully analyze his answers to our questions, we are forced to the conclusion that they are simply opinions based chiefly on the fact that few customers have returned the goods in question or complained about them.

It is well not to put too great confidence in this "no complaint" answer. A recent study showed that less than 5 per cent of a certain very poor quality of material was returned, although it was evident that it could not possibly give the service that was guaranteed on its salvage. Most women are like you and me. We hate to complain. We even forget when and where we bought a certain fabric that faded or wore out too soon. We keep no record of the manufacturer of the articles we purchase.

Sometimes, in desperation, we think of a brand name that our mother relied on greatly and buy that sheet. Buying by brand may be satisfactory in some commodities, but I submit that policies of organization change and qualities may be radically changed as new economic conditions arise. It is also an interesting question whether or not a "well-known" brand may be simply a well-advertised brand and how much more economically we might buy if we only had a way of finding out that some less well known, less expensive, and less highly advertised product was of the same quality. The truth is that if we are honest with ourselves we will admit that most of our purchases, under present conditions are sheer guesses. They are made on the basis of some gayly colored advertisement, the opinion of some friend's friend or a mere gamble.

Total purchases large.

But, some may be saying "Is this really an important matter? After all, I buy only a few dresses a year, relatively speaking, and only a limited amount of any one commodity." But did you ever stop to think that the total of all our purchases makes up the biggest business in the world and the policies of this business are the most far-reaching? The happiness and the prosperity of every family depends on its purchasing habits. I would submit that no business can be successful if its purchasing is done by guess. Every sound business with which I am familiar sets up specifications for the materials it buys. When they are delivered, tests are made and if the goods do not come up to the specifications, they are returned.

It would hardly be fair to bring up these disagreeable truths, unless there are remedies for the situation. There are some of us who have been considering this matter carefully and have come to the conclusion that the only solution is a set of quality specifications for each staple product so that when the consumer is trying to choose between different items within a given price range, she could compare these facts told her by the specifications and select the one best suited to her needs. Such an arrangement would not be as complicated as it sounds.

Facts are wanted.

Suppose we are choosing a blanket and a number are offered us within the price range we can afford to

pay. Wouldn't it help us decide the best one for our purpose if we knew such facts as the tensile strength, the weight, the amount of wool and cotton? Better yet, wouldn't it help a great deal to know their relative heat conductivity, since we are really buying the blanket to keep us warm.

The American Home Economics Association, in cooperation with the American Standards Association, is now discussing with groups of manufacturers the feasibility of this plan, and some commodities are being labelled with a great deal more information than they were formerly. I would suggest that, when making purchases, a little thought be given ahead of the shopping trip to the facts which are really needed about the commodity that is to be purchased. Then read the labels, ask for facts from the retailer, and indicate that it is facts and not opinions that are wanted.

Grading standards useful.

This should not be limited to textile materials. The pure foods and drugs act is giving a great deal of protection to us in buying these commodities, but if we are to benefit by it we must read the labels. The

attempts being made by certain Government agencies to get quality specifications on meats, poultry, fruits, vegetables, and canned goods are in many cases benefiting the producer and distributor greatly, but the consumer only indirectly. A familiarity with these grading systems and the insistence upon their use in retail selling will be of inestimable value to all consumers.

This brings up another closely related matter. There are to-day buried back behind the scenes in the manufacturing and distributing world, many quality standards which the consumer never hears about and which would be very useful to her. There is also in connection with many commodities a more or less technical language which describes the various qualities accurately and are essential to the setting up of any quality specifications for those articles.

I believe very thoroughly that one of the best helps the consumer can give herself to-day is to ferret out these terms, learn their meaning, and be able to talk the language of every commodity. Speaking the same language helps in international conference, it also helps in "buying conference."

SIMPLIFICATION OF ARBOR HOLES FOR SAWS AND GRINDING WHEELS

General Conference Approves Recommendation; Summary Report Submitted to Industry for Signed Acceptance

A general conference held March 20, under the auspices of the division of simplified practice of the National Bureau of Standards, and attended by representatives of manufacturers, distributors, and users, unanimously approved a simplified practice recommendation covering the shapes and sizes of arbor holes for portable electric circular saws and grinding wheels.

It was decided that the approved shape of hole for grinding wheels should be round, while for saws the shapes are to be either round or round with flat sides. The size of arbor hole for these shapes is to be $1\frac{1}{4}$ inches in diameter (with 1 inch across flats where flattened sides are used). The recommendation is to be effective as of January 1, 1931.

In accordance with the usual procedure of the Bureau of Standards, mimeographed copies of the summary report of the general conference will shortly be sent to all interested in the industry, requesting their signed acceptance. When sufficient signed acceptances have been received, representing at least 80 per cent of the industry by volume of production, the recommendation will be indorsed and published.

MEN'S PAJAMAS

Commercial Standard Accepted by Industry for New Production; Defines Minimum Measurements for Pajama Coats and Trousers

Under date of January 30 it was announced that the Recommended Commercial Standard for Men's Pajamas has become effective for new production, since the standard is accepted by a satisfactory majority of production and by a large number of representative distributors and users. The commercial

standard sets up minimum measurements for pajama coats and trousers in sizes A, B, C, and D. These minimum measurements cover such key points as length of coat, chest measurements, arm hole, sleeve length, sleeve around bottom, coat around bottom, as well as the following measurements for trousers: Waist, seat, thigh, rise front, rise back, outseam, inseam, knee, and bottom. Methods for taking each measurement are described and illustrated by sketches in order that no misunderstanding may arise from this source. Mimeographed copies of the commercial standard are available on request.

PLAIN AND THREAD PLUG AND RING GAGE BLANKS

Pamphlet on Recommended Commercial Standard Distributed for Written Acceptance

Pursuant to a request from the American Gage Design Committee, a pamphlet entitled "Plain and Thread Plug and Ring Gage Blanks," Recommended Commercial Standard, as adopted by that committee, was circulated under date of March 4 to producers, distributors, and consumers for written acceptance, in order to determine the extent of actual adoption and in order that it may become more widely effective through establishment as a commercial standard and through publication by the Department of Commerce of the list of acceptors.

The recommended commercial standard includes details of construction for plain cylindrical plug gage blanks, thread plug gage blanks, plain ring gage blanks, thread ring gage blanks, and the official monogram used to identify such gages. The recommendation applies to gage blanks only and does not attempt to set up dimensions or tolerances for finished gages. Copies are available on request to producers or users who wish to examine the recommended standard with a view toward acceptance.

ADVANTAGES OF STANDARDIZING AGRICULTURAL PRODUCTS

Methods of Grading Are Suggested and Advisability of Rigid or Tolerant Application of Rules Discussed by Farm Specialist

By W. C. GEAGLEY, *Department of Agriculture, State of Michigan*

The development of agriculture has admittedly been a process of evolution leading to a more highly specialized production of farm products and thereby contributing one of the greatest economic factors that we have to contend with to-day in dealing with the largest, most universal business of the age—that of supplying food to the inhabitants of this earth.

Competitive, specialized, intensified production inevitably led to changed trade practices from the old-established order and improvement, changes, standardization, and the establishment of grades occurred largely as the results of economic necessity. This feature of the agricultural industry will grow and develop to a point we can scarcely appreciate at this time, and will eventually prove to be one of the greatest stabilizing forces in agriculture just as it has been in every successful industry.

The use of standards and the application of grades in an industry, to be successful, must be of mutual benefit; that is, the consumer or purchaser must derive value, either in the form of a lessened cost or in a better article at the same price, and the producer or manufacturer obtain higher quality raw material that will enable him to produce a greater value at less cost. Unless this spirit of cooperative endeavor prevails, grading of commodities is like the "house built upon the sands."

Purpose of Standards.

Broadly considered, the purpose in establishing standards or grades is to facilitate all of the marketing processes. Farm products may pass through many hands in moving from the centers of production to the wholesale markets. Many times products are contracted for to be delivered in the future and a large part of the business is transacted at long range. It is essential that there be a common designation to insure complete and mutual understanding between buyer and seller. Grades provide this common designation so that it is unnecessary in commercial transactions based on grades to require in minute details specifications as to each factor influencing market quality.

The advantage of standardization, in establishing a common language of terms, and actually separating the product into different grades of market quality is obvious if we expect an intelligent comparison of market prices, business methods to prevail from producer to consumer, and the elimination of waste, both economic and physical. Separation of the product into grades permits more effective distribution and finding the market which will give the grower the largest return.

As a grade factor, in the case of certain products as with grain and beans, foreign material may be considered more objectionable than any other because of its nature. However, in such cases it is easily removed by present-day cleaning machinery and for this reason it is practicable to keep the percentage allowance in the respective grades within narrow limits.

The question naturally arises "What tolerance or variation, from the established conditions set forth in the grades, should be permitted in the grading of farm products?"

Minimum allowance urged.

Because standards are usually based on minimum requirements, little, if any, tolerance should be allowed; that is, a greater variation than is set forth in the standards would automatically reduce the grade to the next lower grade or class. However, it is conceivable that grades could be established, based on an ideal condition rather than on a practicable basis, and in such cases sufficient leeway should be allowed, or a tolerance established which would permit of the acceptance of products which differ, within reasonable limits, due to natural causes, from the ideal condition.

There should be, for the good of any industry, only one source for the establishment of grades. If production or marketing conditions will permit of the establishment of grades that will govern all localities, then proper education, from the producer to the ultimate consumer, as to the requirements for the grades will have a tendency to stabilize and promote a uniform scheme for handling such commodity.

Clarity of nomenclature.

Grades for many farm products can be established and the language used be so clear and definite that they need not fluctuate from year to year nor need to be changed except as evolution in the industry takes place. Nothing upsets or brings about a chaotic condition in an industry more than the continual changing of classes and designations for supposedly standardized grades.

All parties concerned in the matter of the establishing of grades for any agricultural product should be taken into consideration, and grades established that would serve and facilitate both the warehousing and the handling of the product as well as assist the industry that consumes the great bulk of the product. Optional grades are of little assistance to the regulatory official in aiding an industry. They are de-

Standardization of agricultural products is one of the most important economic developments in recent agriculture. Marketing possibilities are facilitated and all parties will eventually benefit. Specification of grades must be careful and definite; they are optional or compulsory according to conditions in the industries involved.

pendent upon the good will and business ethics of those engaged in handling such products, and an appeal for compulsory compliance is therefore of no avail.

In the history of food regulation and control, it is common knowledge that the question of quality did not enter into the enactment of many of our food-control measures. The identity of the articles and its correct designation seemed to be the most important consideration. As the food industry has developed and grown to outstanding proportions, we find that more attention is given to-day than ever before to the question of grades or quality in raw

materials as well as in the finished products, and where standardization has taken place effectively with any commodity, the development of that particular product is one of progress both in quality and value.

A grading bill has been proposed in Congress for fixing a minimum quality for commercially packed food with the thought in mind that substandard, or lower quality of the same type of food would be designated, which would not only offer to the consumer the advantage of selecting a type of food appropriate, but would have a tendency to standardize and stabilize production of raw materials and finished products.

FELDSPAR

Committee Has Recommended a Commercial Standard Classification; Proposal Now Before Industry for Acceptance

The standardization committee representing a majority of the industries interested in feldspar met in Toronto, Canada, on February 18, and, with the authority conferred by the January 14 conference, recommended a commercial standard classification which is being sent to all interests of the industry for formal acceptance.

It was voted to make the effective date for new production on the commercial standard classification three months after the announcement of the success of the project, and the revision interval was set at one year. The standardization committee, which is representative of the entire industry, was continued as the standing committee of the industry to receive comments and consider the desirability of revisions.

COMMERCIAL GRADE STANDARD FOR PLYWOOD

Manufacturers Propose Uniform Grade of Commodity; Assistance of Bureau of Standards Requested in Promulgation of Proposed Standard

Plywood is laminated or built-up wood used for table tops, and other furniture, interior paneling, and a wide variety of uses. It is made in many species of woods, using faces of the most common ones for strictly utilitarian purposes and the most expensive, carefully matched veneers for high-grade furniture.

Because of the diversity of uses and kinds, many different methods of grading have evolved that work a hardship on both the buyer and seller because the buyer has no real conception of the manufacturer's grades except through direct experience.

To obviate the confusion and misunderstanding that has attended the industry, the manufacturers of plywood, as represented in the Plywood Manufacturers' Association, have set about to establish uniform grading and have voted to request the cooperation of the division of trade standards, Bureau of Standards, in securing their general adoption and use.

The commercial standard grading rules will refer both to the construction of the panel and the natural defects appearing in the faces of the piece which cause it to fall into one of the several grades that will be established.

Uniform classifications will provide a definite working basis for the manufacturer of plywood panels and tops and will also give the furniture designer something definite on which to estimate his costs. It is further anticipated that interest will be aroused in the production and use of higher quality plywood.

BRITISH SPECIFICATION FOR OIL SWITCHES

Revised Engineering Specification Deals with Oil Switches and Circuit-Breakers

The British Engineering Standards Association have recently issued a revised specification, designated 116-1929, which deals with oil immersed isolating switches and circuit-breakers. In the preparation of this revision, due regard has been had to similar work done in other countries, with a view to cooperation in international standardization.

The specification is intended to cover indoor circuit-breakers up to 33,000 volts and outdoor types up to 220,000 volts. Useful appendixes are included, giving notes on the care and maintenance of circuit-breakers, and also on the measurement of voltage and sphere gaps.

KEEPING SIMPLIFICATIONS UP TO DATE

Periodic Surveys Insure Conformity with Current Demands of the Industry

To keep abreast of current practice and changes in demand, simplified-practice recommendations are constantly undergoing review and revision by the standing committees of the affected industries.

The division of simplified practice cooperates with these standing committees in making periodic audits of active programs to determine the degree or extent of their actual adoption and use. Surveys likewise provide the basis for constructive revision of an established simplified line. It is estimated that approximately 35 to 40 surveys in as many industrial fields will be in process during the present calendar year. The data collected through this cooperative service of the division is analyzed and summarized, and results placed at the disposal of each standing committee for such action as will insure an up-to-date and effective recommendation.

Experience has proven that the success of any standard is measured by the degree of its actual application and use.

APPLYING SIMPLIFICATION TO A "BUSINESS AS A WHOLE"

Prewar Business "Set-up" Restricted Sales to Retail Merchants; War Created a More Serious Study of Distribution Problem; the Manufacturer, the Wholesaler, and the Retailer Each Only a Department in the Business of Distribution; Must Cultivate the Support of the Consumer, Says Writer

By L. H. BRONSON

Limited as the volume of its business is by the geographical layout of its territory, The Bronson & Townsend Co., was forced to find some other incentive than mere size, as a stimulus to its better and greater growth. This substitute expressed itself in the development of our business as an experimental laboratory of distribution. By that I mean that we have applied the laboratory method to every operating detail of the business, including buying, selling, and warehousing. Because the geographical situation limited the size of the territory which could be economically served from New Haven we naturally concentrated on something else those energies which would normally have been devoted to expansion of territory. Perhaps, it would be incorrect to say that we started out with a clear thought in mind of developing our business in just the way we have, but as I look back upon the work of these last 10 years it seems almost as though no other result could have been the outcome.

In order to make the story of the development of this experimental laboratory intelligible to the reader, I must sketch as a background the "set-up" of our business as it was some years ago.

Prewar conditions.

In the days before the war our business differed only in detail from that of other similar enterprises engaged in the wholesaling of hardware. Perhaps we gave a little better mechanical service than did some. We made it our practice to ship every order the day it was received, to mail out the invoice on the day following, to send out statements on the first day of each month, and to answer every letter the day it reached us. In addition to doing these things, we prided ourselves on our freedom from mistakes and on the completeness of our shipments. Rarely did we have more than five or six shipping mistakes reported during a month, and back orders of regular stock goods for a period of over 20 years amounted to less than 1 per cent of the items ordered.

All of this, however, was largely a mechanical service, fairly perfect, but impersonal. So impersonal that we had little, if any, real interest in the success of our customer, the retail merchant, nor in the welfare of the manufacture. As for the consumer—he never entered our minds. True, we long before had determined that it was poor business to sell the retail merchant and then turn about and sell his natural

customer, the consumer. We, therefore, restricted our sales to retail merchants. For similar reasons we had some years before decided we could not justify a variable pricing system and so we had adopted a one-price selling plan. Aside from a few other things similar to these we differed little from other wholesalers.

Distributional methods studied.

Perhaps it was the war which caused us to begin a serious study of the whole problem of distribution. If I were to be entirely frank with you I probably would have to acknowledge that self-interest was the original native power, and it still is, but directed now,

I hope, more intelligently. More intelligently because it now recognizes that self-interest best serves us when we honestly and sincerely best serve others.

To get back now to the closing months of the World War. The leaders of our business asked each other this question: "What will be the big change in merchandising and distributing methods as a result of the war?" None of us was

successful in answering this question, but we all came to accept one conclusion, which was that the consumer would have more to say about business methods than he had ever had before.

Just about this time we got a conception of distribution which has helped to guide us along many of the uncharted ways we have been following these last few years. We came to see that no real profit was made by any one of the three factors who make up distribution, until the consumer had bought a piece of merchandise and had used it to his own satisfaction. We came to see that the manufacturer made no real profit in selling us, nor we in selling the retail merchant. All real profit came from the sale to the consumer. In other words, the manufacturer, the wholesaler, and the retailer were really each one only a department in the big business of distribution. Therefore, that which was of advantage to one would eventually be of advantage to all, and conversely that which was detrimental to one would be detrimental to all.

Furthermore, it was the consumer who must be cultivated. Right at that time, and during the first year or two following the war it seemed as though, perhaps, the consumer could be ignored without distributive business suffering materially. There was a shortage of merchandise and all of us could sell almost

This article by L. H. Bronson, of Bronson & Townsend Co., New Haven, Conn., was submitted to the Shaw simplification contest. The article, which describes the effect of simplification when applied by an individual manufacturing concern, is published in the *COMMERCIAL STANDARDS MONTHLY* through the courtesy of the author.

anything we could get hold of. But we, in our business, felt very sure that it would be shortsighted to take advantage of that situation. Eventually the consumer would show his power, and when he did, established business would need every bit of good will it was possible to have stored up.

New methods tried out.

We felt very sure new methods of distribution would be tried out, and there was danger that the particular method we were following in the hardware field (from manufacturer to wholesaler to retailer) might be found inefficient in some particulars. The consumer would surely in the final analysis buy from that source which could furnish him merchandise of a satisfactory quality at the lowest price, allowance being made for necessary service. Although we were confident that the manufacturer-wholesaler-retailer plan of distribution was able to take care of the consumer's hardware requirements more economically than any other method could, we recognized that wastes and loose methods had crept into our distributive machinery. As is always the case, the consumer was paying for this waste. Temporarily he might overlook it or, perhaps, not realize what such things were costing him, but there would come a time when we would have to meet the severest competition and the only way we could hope to survive would be to meet this competition as far as the consumer was concerned, price for price, and quality for quality. It might be possible that the consumer would be willing to pay a little something extra because of the superior services our method gave him, but we knew that we must be sure not to charge more for any service than it was worth, nor to make use of any service which cost the consumer more than he would be willing to pay if he were to know its direct cost. In other words, we felt sure that the manufacturer-wholesaler-retailer method of distribution would have to demonstrate to the consumer that it was as economical as other methods which might be developed if it were to have his (the consumer's) continued and loyal support. And without his real support any method of distribution even though it might not cease to exist, would become non-profitable and unattractive.

Eliminates wasteful efforts.

Naturally the first thing we started in to do was to eliminate from the operating end of our business everything wasteful and inefficient. I will not go into the details of the changes made, but we did succeed in making our business machine operate at a much less cost and with greater efficiency. In fact we pretty well convinced ourselves that a similar reduction in costs on the part of the other two departments (the manufacturer and the retailer) in the big business of distribution added together would lower the prices charged the consumer enough to get the consumer's complete support. But the business of distribution is not under one management, and although our costs were being brought under control the costs of the other factors were, according to general reports, increasing.

At just about this time Mr. Hoover was bringing forward his plan of simplification and elimination as applied to manufactured goods. We followed with great interest that story of progress. We saw how

this elimination of the unnecessary in a manufactured line made possible a lower price to the consumer.

One day this thought came to us. "Why not apply Mr. Hoover's idea of simplification and elimination to a 'business as a whole'?" If it worked with a manufactured line it ought to work with a business, and perhaps here was the way to lower costs in distributive business and through lower costs interpreted in lower prices win and hold the support of the consumer.

Developed business as experimental laboratory.

We realized that the adoption of the plan would probably lead us into uncharted seas and that there was danger in the experiment. On the other hand, if we were to be successful others would copy or make similar experiments. And that was the important thing. For although temporarily we might through our own efforts be successful through a period of years we could be successful only as the general methods of distribution we were following met the consumers' needs and received his support. It was at this time we decided to develop our business as an experimental laboratory.

There were three problems we picked out as our first study.

1. What retail merchants should we try to serve?
2. What territory should we try to cover?
3. What variety and lines of merchandise should we carry in stock?

We determined right at the beginning to follow that course in each case, where sound economics and sound morals seemed to point the way, having courage to believe that satisfactory profits would always result.

Retail merchants served; important problem.

Of course, as in any laboratory we collected all possible related facts before determining what to do. Some of the facts were easy to get, others required much time and study. We began by a careful study of our customer list. As I have already said, for years we had confined our sales to retail merchants who bought from us to sell again. Up to the time of the war such a rule was all that was necessary. But as a result of the war there developed a tendency on the part of most merchants to try to expand their businesses by adding new and competing lines. The outcome was a very large increase in the number of those merchants—drug, grocery, and other types—who carried in stock some items of hardware. The result was that retail sales of hardware were spread out so thin that profits were reduced below a safe margin. It seemed to us important that established retail merchants should be allowed to make a reasonable net profit if they were to serve the consumer satisfactorily. Furthermore, we were fairly sure that the increase of retail outlets who bought only limited lines from us was increasing our own overhead. We, therefore, determined to find out what it cost us to keep an account on our ledger. It would take too long to explain the details of that laboratory investigation, and so I will set down here only the conclusion arrived at.

It was this: Any ordinary order for less than \$15 worth of merchandise was unprofitable. An order running from \$15 to \$25 in value was profitable or unprofitable depending largely on the amount of sell-

ing time used, and the class of the merchandise sold. An account which averaged under \$50 per month and made up of orders which averaged less than \$15 per order was unprofitable. Using these figures as our measuring rod, we went through our sales ledger and found that of the 1,464 accounts listed 734 were unprofitable. A further analysis of these 734 unprofitable accounts brought out this fact: More than 90 per cent of them were of merchants who carried no general line of hardware, but who had put into stock certain items of hardware in order to expand their sales. In other words, these accounts were not only unprofitable to us but, in addition, our selling them was detrimental to the interests of our natural customer, the established retail hardware merchant.

Territory covered next considered.

The next problem we approached was that of the territory we should try to cover. Located as we are on Long Island Sound we could operate only in the half circle north of the sound. Furthermore, the Hudson River, less than 100 miles west, was a traffic barrier which it was almost impossible to get by, and on the east as we approached Boston the railroad layout, radiating as it does from that city, caused such transportation delays that we were practically excluded from that territory. We were left with a territory roughly 150 miles wide running north from Long Island Sound, bordered on the west by a line just east of the Hudson River, and on the east by a line running north through Worcester. It has always seemed to us that it was a compact territory and one fairly economical to travel. But when we began to study intensively the cost of covering it we found many surprises. We found the cost of selling varied from just over 3 to as high as nearly 15 per cent. Knowing as we did that any territory which had to have a selling cost of over 8 per cent charged against it was unprofitable, it is obvious that we took immediate steps to eliminate that part of our selling territory which cost us materially over this amount to cover.

Lines of merchandise carried in stock also studied.

The third and final step which we took at this time in our plan of simplification and elimination as applied to a "business as a whole" had to do with the lines and variety of merchandise we should carry in stock. We recognized our responsibility to carry in stock such an assortment of hardware as would take care of the reasonable requirements of the retail merchants we were trying to serve. This, of course, obligated us to carry some hardware lines which were nonprofitable in order to give needed service. We, however, did not feel that we were under obligation to carry more than one line of the same kind and grade. By this I mean that after deciding upon one standard line of saws, axes, hammers, etc., we did not feel called upon to carry a similar grade made by some other manufacturer. We naturally tried to

choose those lines which were most favorably known in our territory.

We endeavored to accept our full responsibility toward the manufacturer by cooperating with him in the development of his own sales policies. We made a point of selling the manufacturer's name as well as his merchandise and refused to sell under our own label. In determining the variety of each line we should carry we depended on a perpetual stock inventory which we had kept for years. This record showed not only the quantity of each item sold but also the number of sales. It seemed only reasonable to us to refuse to continue to carry in stock items which had not sold at least three times during the previous year. This was the rule which we applied to strictly hardware items. Nonhardware items were continued to carry only when they could be sold at a profit. In other words, we did not feel that there was any obligation on our part to carry nonhardware items unless their sales resulted in a net profit to us.

When we started in on our plan of elimination we were carrying in stock just over 10,000 items. When we got through the numbers had been reduced to just under 7,000.

Necessarily it took some courage to put into effect some of the plans which our investigation seemed to prove were sound. We had, however, at the beginning decided that we would follow along where sound economics and sound morals appeared to lead, believing that adequate profits would result. The fact that our business was not too large and was under thorough control made it possible for us to use it as an experimental laboratory much more safely than could have been done in the case of a larger business. And yet I must confess there were many times when I almost questioned the wisdom of our decisions. Necessarily there is no point when it can be said that plans such as we are following have been completed but we have already gone far enough to know that they are successful, and presumably the further we go the more successful they will prove to be. Perhaps just a few figures here at the end will visualize better than any further general statements just what we have succeeded in doing.

Results of simplification.

Fifty per cent of our customers have been eliminated.

Twenty-eight per cent of our territory has been eliminated.

Thirty-one per cent of our stock items have been eliminated.

These changes naturally have resulted in some decrease in gross sales, but the volume of net profits increased 35 per cent in three years and the percentage of net to sales increased 68 per cent.

We are still using the laboratory method in developing the idea of simplification and elimination as applied to a "business as a whole."

BUILDING CODE SURVEY IN PROGRESS

A survey of the status of building codes throughout the country is being made by the division of building and housing of the Bureau of Standards. The information sought includes the age of codes now in use, whether they are under revision, how revision is being

done and its estimated cost, the major features likely to be changed, and other items. Previous surveys have developed interesting and valuable information which has been utilized by the Department of Commerce Building Code Committee in determining its program of work.

TRENDS IN BUYING STIMULATE STANDARDIZATION

Forward-Looking Manufacturers Are Pooling Experience Concerning Their Commodities to Formulate Commercial Standards

By I. J. FAIRCHILD, *Chief Division of Trade Standards*

The past decade has witnessed a decided trend on the part of professional purchasing agents toward the use of specifications as a basis for buying, until at the present time professional purchasers quite generally are committed to the policy of purchasing on specifications. As witness to this fact, the National Directory of Commodity Specifications lists more than 27,000 specifications, among which considerable overlapping and conflict are evident. There is apparent, also, a decided tendency on the part of the household buyer to inquire more deeply into the relative merits of competing commodities and to demand that purchased goods shall present, at least, a certain service value.

As a part of an editorial in a recent issue of *Nation's Business*, Merle Thorpe says, "Each generation has its dreadful hippogriffs of change. * * * But change is the immutable law. The innovations of one age become the familiar practices of the next. Revision, remodeling, progress everywhere. The inexorable pressure of the new, the fresh, the original. We may defy, we may protest, we may issue ultimatums, we may pass resolutions—even laws—we may sulk in silence, yet the world does move and the directing force of human activity is forwarded."

Industries recognize this trend.

Many industries have recognized this trend toward increasing diversity of specifications and toward a demand on the part of the consumer for assurance of quality. Instead of sitting idly by, and meekly accepting the situation, forward-looking groups are stepping out in front of the specification procession by taking the initiative in the establishment of commercial standards, which entire industries recommend as a basis for purchase and which are used as a foundation for marketing the commodity and restoring public confidence in its service value.

These industries are pooling their intimate knowledge and experience concerning the goods which they produce, and are recommending rational specifications which search out the most important criteria of quality. It is evident that a specification, drafted by manufacturing experts honestly endeavoring to give consumers the benefit of their knowledge, and adjusted to meet the comments and suggestions of distributors and consumers is almost sure to be of a character to command respect, warrant its general adoption, and to gradually restore the general character of the industry to a higher level.

"Good will."

"Good will" is recognized everywhere as a most important business asset. It requires a long time, earnest and steadfast effort to build, but is easily destroyed. It is bought and sold and yet is given freely to those whose policies of honesty and fair dealing are plainly evident. A constantly increasing number of industries, recognizing the new competition in which whole industries vie with one another for a share of the consumer's dollar, are building foundations for greater "good will" for themselves as a group by the establishment of commercial standards. The commercial standards procedure is one of the most efficacious methods of setting up such a uniform basis for fair dealing and assuring the consumer of satisfactory quality.

The function of the National Bureau of Standards in such work, after receiving the request, is fourfold: First, to act as a referee to secure adequate consideration of the needs of all interests; second, to supply such assistance and advice in the development of the program as past experience with similar programs may suggest; third, to solicit and record the extent of adoption and adherence to the standard; and fourth, to add all possible prestige to the standard by publication and promulgation after it is adopted and accepted by all elements directly concerned.

The service leading to the establishment of commercial standards is available upon request to any industry which feels the need of improvement in competitive marketing conditions; in means for obtaining better understanding between buyer and seller in a reduction of the diversity of specification requirements; or in the establishment of a uniform basis for marketing as a means of increasing good will for the entire industry.

No charge for service.

There are no fees connected with the service, the only requirement being that an industry shall indicate voluntarily its willingness to cooperate. No claim is made that commercial standards are applicable to all industries or to all commodities, but it is hoped that this service will be given consideration in connection with the present problems of many industries and that those who feel the need will not hesitate to request the cooperation of the National Bureau of Standards in the establishment of commercial standards.

SPECIFICATION FOR OIL-BURNING APPARATUS AND FUEL OIL ON SHIPS APPROVED

General instructions covering "care and operation of oil-burning apparatus and handling of fuel oil on ships," have been approved by the executive board of

the American Marine Standards Committee. Numerous suggestions received by the board in connection with the membership vote on the preliminary draft have been referred to a special editing committee for consideration and for incorporation in the printer's copy as far as the committee may deem practicable.

QUALITY OF LEATHER IMPROVED BY STUDIES OF TANNING METHODS

Effect of Various Materials as Fillers Is Determined and Length of Wear of Products Extended by New Practices

By R. C. BOWKER, *Chief Leather Section, Bureau of Standards*

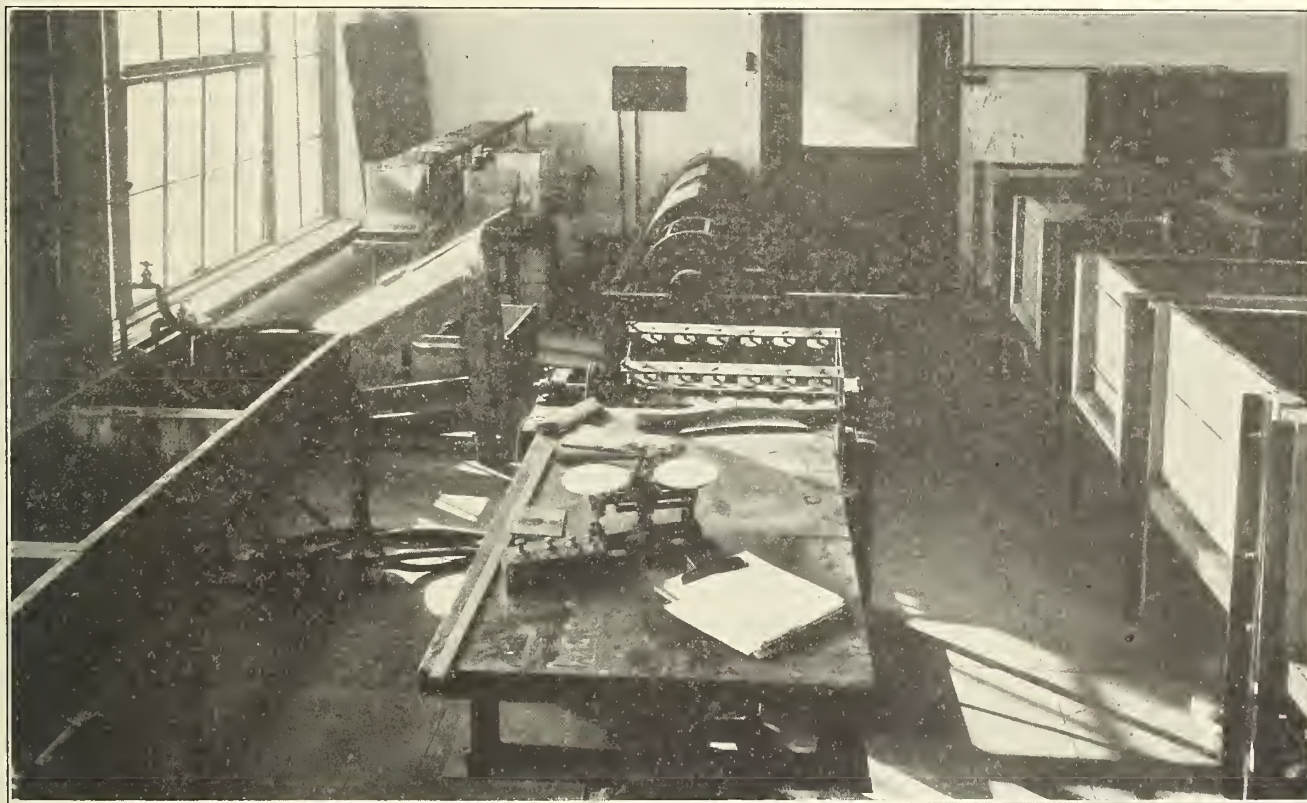
Leather possesses a peculiar resistance to standardization because of the fact that the basic raw materials, hides and skins, are products of nature which are little subject to control. They are not uniform, are of complex composition, and a single hide or skin lacks the homogeneity of substance and texture characteristic of many other raw materials.

A lack of knowledge of the composition of hides, tanning materials, and the reactions taking place be-

useful properties, develop quality standards defining basic requirements, investigate how it may best be utilized, are the aims of the leather laboratory.

The scope of the activities and their relation to industry are best illustrated by brief descriptions of some of the work done and in progress.

The largest single item of production in the industry is sole leather. The wearing quality of shoe soles is of interest to nearly everyone, and, consequently,



Experimental tannery

tween them, has resulted in the development of the leather industry by empirical methods with practical experience at a premium.

In recent years science had made very valuable contributions to the industry. These relate in particular to the mechanical equipment for making leather, new materials for use in its manufacture, and the development of methods by which processes may be more accurately controlled. A distinct forward step has also been taken by the industry in undertaking research to discover the fundamental principles underlying the tanning processes.

To improve leather, make it last longer, cheapen its cost by new methods and materials, determine its

investigations relative to this subject have always occupied a part of the program under way at one time.

The first attack on this subject was the design of a laboratory apparatus to determine the resistance to abrasion of this material. In order to check the results obtained with the apparatus, service tests were also made, with particular reference to the comparative durability of leather cut from different locations on the hide. The results of this work showed a satisfactory agreement between the laboratory and service tests.

A large difference was shown in the comparative wear of leather from different hide locations and it was demonstrated that this was by far the most influ-

ential factor governing the durability of a single sole from any one type of tannage. This served to emphasize the careful selection of shoe soles on the basis of hide location in order that the consumer might receive maximum service.

An investigation of the effects of glucose and salts on the wearing quality of sole leather was conducted, using four typical tannages. It was shown that these materials, sometimes considered as adulterants for weight-making purposes, had little effect on the durability under normal service conditions, but that those leathers containing a high percentage had lowered resistance to water penetration. The general effect of this work was the limitation of the commercial use of these materials to the amount considered necessary to secure the desired properties in the leather.

The application of the chrome method of tanning in the manufacture of sole leather created a demand on the part of industry for information concerning its durability as compared with vegetable-tanned leather. The results of a large number of service tests showed that natural chrome-tanned leather wore about twice as long as the vegetable-tanned leather but was found to possess disadvantages, such as lack of waterproofness and firmness.

These results stimulated experimental production of chrome-tanned leathers, filled with various greases and retanned with vegetable materials, in order to secure a leather possessing the added wear resistance afforded by the chrome method and having the desirable characteristics of vegetable-tanned leathers. Durability ratings on various of these combinations have now been secured from tests in actual service. These have helped the tanner to evaluate the product of any given process and have resulted in an increased production of this type of leather.

Other tests on the durability of sole leather have shown that leather which is curried with grease similar to belting leather wears longer than ordinary sole leather, but that an initial application of waterproofing materials to finished leather has little effect upon its wearing quality.

The use of sulphite cellulose extract, a cheap material derived from the waste liquors from pulp mills, was prohibited during the war in the making of leather for military purposes. Work undertaken by the bureau to determine the effect upon the durability of sole leather of filling it with this material showed that such leather wore equally as well as leather filled with the ordinarily used tanning materials. This resulted in the elimination of the prohibitory clause from the specifications and stimulated the use of this cheap material in the tanning industry.

Further investigations were carried out relative to the use of this product in the actual tanning processes, and it was found to possess definite tanning properties. Leather produced with it in admixture with other tanning materials had a tensile strength and wearing quality comparable with these properties in leathers produced with the ordinary vegetable tanning materials, such as chestnut wood and quebracho wood extract.

Because of the low cost of the material, economy results from its use by virtue of the fact that it may be substituted for higher priced imported materials.

Its suitability for tanning purposes has a further significance in that it will offset the diminishing supply of our other cheap source of tannins, chestnut-wood extract, the source of which is rapidly being eliminated through blight. Many tanners are experimenting with this product along the lines suggested, and the results of the work have been widely distributed in many countries throughout the world.

Synthetic tanning materials derived from coal-tar products are new materials for use in making leather. Considerable research was done to classify these materials according to their tanning properties and action on hide substance which is of value to both the maker of the products and the tanner.

Studies of the physical and chemical properties of many different leathers have produced information which serve as the basis for the existing Federal specifications for leather. The most important of these specifications are those covering leather belting, sole leather, lace leather, upholstery leather, packing leather, rigging leather, and bag leather. By the use of these standards the Government has effected economy in purchase and is assured of uniformity in quality. The industry has benefited through these tangible expressions of quality and has cooperated in keeping them up to date as new methods and uses have developed which influence commercial practice.

As the result of a research, the point was determined at which stuffing russet harness leathers with oils and greases has the most favorable effect upon the tensile strength of the leather. Mineral-type oil has the same effect as cod oil, and the short-time tannage makes for greater strength, but the longer-time tannage produces greater resistance to shear when used with a buckle. The information on the buckle strength of these leathers has a direct application in industry in those products such as harnesses and linemen's safety belts.

Tests also showed that the ordinary storage of leather did not effect its quality. Leather stored under usual conditions of humidity, temperature, ventilation, and light for 10 years deteriorated only 15 per cent in strength.

A bureau technologist studied the principles of leather measuring devices and sources of error. He found that such errors usually favored the buyer. A suggested design was worked out and a procedure for performance tests was devised. The test results on 3-wheel measuring machines were published with typical calculations of essential factors.

At the present time the personnel of the leather laboratory is actively engaged in studying the effects of sulphuric acid on the life and properties of leather. Samples prepared with the important tanning materials are being treated with different percentages of acid and stored for varying lengths of time up to two years. Deterioration as influenced by the amount of the tanning material used, the percentage of acid added, the grease content, relative humidity, and time is measured by the change in tensile strength. The work also includes fundamental studies regarding the action of the acid on the constituents of leather. In addition to establishing the limiting amounts of acid which may be safely used in leather, the research has

interesting possibilities in indicating the tanning materials best suited for the production of durable leathers.

Comprehensive studies are also being made on the properties of all types of leathers as influenced by tanning, finishing, source of skin, and service conditions. The object of this work is to make information on the value of leather for different purposes more

generally available, and thus to contribute to the increased use of the material.

The response of the industry to the work accomplished and being done is shown by the active cooperation of the American Leather Chemists' Association, the Tanners' Council of America, the Calf Tanners' Association, and the American Leather Belting Association, through standing committees.

WHAT TIME IS IT?

Answer to Question "What time is it at Any Point on the Earth?" Available Through Bureau of Standards Calculator

The growing frequency of international radio broadcasting has increased the demand for a simple device by which the time at any point on the earth's surface can be determined in relation to the time at some other place, such as Washington. This need is met by a useful little calculator known as a time conversion chart brought out by the National Bureau of Standards nearly a year and a half ago.

This device employs two divided circles made of heavy cardboard, the smaller being mounted above the larger, and free to turn. This smaller circle is divided into 24 hours, while the larger indicates longitude east and west of Greenwich with the names of the various countries at their appropriate positions. By setting the inner circle so that any given hour of the day comes opposite any given longitude the time at any other longitude can be read off directly. Thus by setting 12 o'clock noon opposite longitude 75 west (eastern United States) we find that the corresponding time at 0 longitude (Greenwich) is 5 p. m., while the time at longitude 120 (the Pacific coast) is 9 a. m.

This useful device may be obtained from the Superintendent of Documents, Government Printing Office, Washington, D. C., at 10 cents per copy. It is designated as Bureau of Standards Miscellaneous Publication No. 84.

NEW BRITISH PUBLICATION ON TIMBER TESTING

Pamphlet Entitled "Methods of Testing Small, Clear Specimens of Timber" Compares Mechanical Properties of Timber

The British Engineering Standards Association has just issued a publication entitled, "Methods of Testing Small, Clear Specimens of Timber," and designated No. 373-1929. The purpose of the pamphlet is to compare the mechanical properties of one species of timber with those of another.

The new specification covers the standard methods for carrying out all the usual tests, including moisture content, compression, static bending, impact hardness, cleavage, shear, tension, specific gravity, and shrinkage. A table is given showing the tests recommended to indicate the suitability of timber for specific uses. The association has worked in close touch with the Forest Products Research Laboratory in the preparation of the specification.

Further experiments are being carried out in the laboratory to determine a standard method of drying

specimens of timber. This will be submitted to the committee responsible for the specification, when the latter is revised, with a view to drawing up more comparable determinations for shrinkage and specific gravity. The methods included in the present specification, however, have been generally adopted and are producing useful results.

BRITISH SPECIFICATION FOR TAR

Revised Specification for Tars for Road Purposes

The British Engineering Standards Association has issued a revised British standard specification for tars (Nos. 1 and 2) for road purposes. The specification which is designated No. 76-1930, has the full support of the Ministry of Transport.

It covers, as formerly, tar for the surface tarring of roads and for making tar macadam. The methods of testing and the specifications for the apparatus to be used, both of which are contained in appendices, have been specially prepared by the standardization of tar products tests committee. They provide for the determination of every property of the tar covered by the specification, and are prescribed in much greater detail than in specification No. 76, Part I-1928, which is now superseded.

STANDARDS ARE PROPOSED FOR MEDICINAL TABLETS

Following requests by manufacturing associations, suggested quantitative tolerances on medicinal tablets and ampules, with methods of analysis, have been placed in printed form, according to an announcement by the Department of Agriculture. The sixth and seventh reports of the committee representing the American Drug Manufacturers' Association and the American Pharmaceutical Manufacturers' Association contain these proposed tolerances, for the information and consideration of the Department of Agriculture and the drug trade.

The medicinal tablets involved are: Caffeine citrated, bismuth subgallate, bismuth subnitrate, and mercuric iodide. The ampules are of caffeine sodium benzoate, camphor in oil, pituitary extract surgical, silver nitrate, sodium cacodylate, sodium iodides, and sodium salicylate. Amendments to previous reports on calomel tablets and calomel and soda tablets are given in the report. Copies of the report may be obtained from the Food, Drug, and Insecticide Administration, United States Department of Agriculture, Washington, D. C.

A PERSPECTIVE OF SIMPLIFICATION MOVEMENT

Division of Simplified Practice During Past Eight Years Has Passed Through Several Stages of Development

EDWIN W. ELY, *Chief Division of Simplified Practice*

There is an old saying, "it is sometimes hard to see the forest for the trees." This magazine, and its predecessor, the MONTHLY NEWS BULLETIN, has presented to its readers a running account of projects handled by the division of simplified practice. This current record may be compared with that presented by other publications which deal with news rather than with history or prophecy. But details, even though interesting in themselves, may crowd in to such an extent that they obscure the general picture. In order to get that general picture, we must summarize past activities along broad lines, not only to distinguish past trends but to look ahead.

Any institution evolves through a number of stages of growth, but the transition from one stage to the next often passes unnoticed at the time. The growth of the division of simplified practice is no exception to the rule. Organized in 1921, it was in a formative stage for about two years, during which its methods and procedure were being worked out. Fortunately, it had little groping to do, for its general policy and purpose were soundly based on the exhaustive report of the Hoover Committee on Waste in Industry. Relatively few simplified practice recommendations were completed during this early period, but knowledge of the function and methods of the division gradually spread.

Rapid growth in four years.

The period from 1924 to the spring of 1928 may be described as the stage of rapid growth. The procedure of the division had become thoroughly organized, and its output rapidly increased. This period shows a record of steady pioneering in new fields, but the projects handled were largely confined to manufac-

tured products. A third stage began in 1928, distinguished by an increased effort to maintain a high degree of adherence to recommendations, and by an extension of the simplification idea into the distribution field. Both of these lines are being intensively followed to-day, and it is becoming evident that the division is about to enter a fourth stage, which will be a logical outgrowth of those preceding.

Only when we skip the intervening years and compare 1930 with 1922 can we realize how far the division has come, and how thoroughly the philosophy of simplified practice has permeated the industrial structure. After eight years of growth, the division may well be said to have reached adolescence. It has a sound background of knowledge and experience, both of facts and methods. A perspective of its past accomplishments provides a sound basis for prophecy, and "coming events cast their shadows before."

Simplification saves money.

Simplification of manufactured products, backed by increasing consumer interest, will continue to save money for all. Simplification in distribution equipment has already gone far, and is opening ever wider fields for waste elimination. Our greater transportation systems are studying numberless possibilities for reducing variety of equipment, materials, and supplies.

Simplification of commodities tends to bring about simplification of method and practice. The next eight years bid fair to show even greater progress than those just past. The division looks forward with justifiable confidence that its work will increasingly stimulate the characteristic American idea of true cooperation within industries and between industries.

STANDARDS NEEDED IN PUBLISHING FIELD

Uniform Page Widths Would Prove Beneficial to Publishers, Newsprint Manufacturers, and Advertising Agencies Alike, Says A. N. P. A. Official

"The printing business is singularly free from any recognized standards on many items which should be established for the benefit of the industry," stated W. E. Wines before the recent convention of the Pennsylvania Newspaper Publishers Association, at Williamsport. Wines, who is manager of the mechanical department of the American Newspaper Publishers Association, spoke on Standardization of the Printing End of the Newspaper Business.

Following a brief discussion on the lack of standardization for thickness of electrotypes, Wines reviewed the diversity in paper roll wrappers. "Some of the newspapers that have spent considerable time and effort on the standardization of paper handling and paper transportation," he said, "have reduced their wrapper weight and have also reduced their transit waste."

Discussing page sizes, Wines pointed out that "a uniform set of widths would be a boon to newsprint manufacturers and to the publishers. If such standards were effected, newsprint manufacturers would not need to make so many different lengths of rolls. Advertising agency men say that they have too many different page widths to contend with. This makes extra expense, and comes out of the advertisers' appropriations, eventually leaving less for the publisher. An influence toward standardization may come later with the use of the Teletypesetter. When this comes along it certainly will be highly desirable to have a standard column width."

In a recent issue of Editor and Publisher, J. E. Murphy, production manager of the Minneapolis Tribune, made a review, along similar lines, of the lack of standardization in the mechanical side of the newspaper business. A summary of his views appeared in the February issue of the Commercial Standards Monthly.

STANDARDS PERMIT MAXIMUM PRODUCTION

Simplifying Varieties of Designs Enables Full Employment of Production and Distribution; Thomas Edison Says Those That Want "Special" Items Should Be Willing to "Pay the Price"

Thomas A. Edison in his article *A Great National Asset*, which recently appeared in the *Saturday Evening Post*, stated:

The more waste in the production of an article, the higher must be its price to the public and the lower must be the profits of the manufacturers, the distributors, and the workmen involved. Raising the price always lowers the buying power and, therefore, makes for general trade dullness.

If, on the other hand, we get out designs, not only in a single factory but throughout all the units in the industry, down to the minimum that the public really wants, we can then, and only then, use the full force of production and distribution. We can then make machinery count. And nobody knows what this will mean in the way of cheapening goods.

We need to develop more standards. When I say "develop standards" I do not mean standardization. I take the word "standardization" as something which has to do with a single shop rather than with a whole industry. To involve standards in an industry means the accepting by the industry of certain standard sizes and types. For instance, all lamp sockets are now of the same size. Any lamp that you buy will fit any socket, but all the sockets are by no means alike. They vary according to the manufacturer. It is simply that all are agreed on the diameter and the threading of the inner shell.

Meaning of simplify.

An industry would be standardized if all the articles made by the units in the industry were exactly alike. To simplify means that the trade agrees on fundamentals. Then the individual factory may or may not standardize its own production,

but whatever it does, will be in accordance with those fundamentals. For instance, a nine-and-a-half stocking would always have the same size, no matter what hosiery company knit it.

We must, however, bear in mind that there are two kinds of industry. One is not industry at all. There is a distinction between a shovel and a Paul Poiret gown, and this distinction extends throughout manufacturing and retailing. There is no point in attempting to apply economic principles to objects of art. This is not to say that the ordinary, everyday things we use should not be of artistic design. But anyone who wants an especially designed article, one of which there is no duplicate, should be prepared to pay the price. And generally the price is a minor consideration.

But the ordinary necessities of life—the food we eat, the clothes we wear, the ordinary run of house and office furniture and fittings—are on a very different basis. It is the production and consumption of these articles, not the luxuries or art objects, that make the prosperity of the country and it is in the field of the necessities that the opportunities for simplification lie. For we are carrying a vast amount of useless baggage.

Use of machinery.

We have various kinds of automatic machinery, but unless a considerable production be had in a single type of article it is hardly possible to use even semiautomatic machinery, much less to use the full automatic. Such machinery will not pay unless it be run continuously on one kind of work, but if one cuts down one's line and goes in for quantity production, then automatic machinery will pay. It will pay high wages, high profits, and cause low prices.

PROPOSED SPECIFICATIONS FOR SHIP STEEL

Specifications Covering Steel for Plates, Shapes, Bars, and Rivets for Ship Construction to be Formulated

A suggestion that marine standard specifications be developed to cover steel for plates, shapes, bars, and rivets for ship construction, to include the physical and chemical requirements, the allowable tolerances for thickness and weight, methods of test, location and method of selecting test pieces, and instructions to inspectors relative to failure of test pieces, has been approved by the executive board of the American Marine Standards Committee. The subject is to be initiated by calling a conference of the prime interests concerned, under the auspices of the American Marine Standards Committee, with the cooperation of the American Society for Testing Materials.

CHARGING PLUGS FOR ELECTRIC VEHICLES

The British Engineering Standards Association has announced the revision of the specification for charging plugs and sockets for electric battery vehicles. This specification differs from the previous edition mainly in the fact that the plugs and sockets are rated for use on circuits up to 250 volts, whereas, in the former edition, the plugs were intended for use on circuits up to 120 volts only.

Considerable attention has been paid to the means for securing interchangeability, and the gages have been redesigned for this purpose. Tests are laid down to secure the employment of satisfactory insulating material, and reference also is made to the means of gripping the cable.

NEW MARINE STANDARD SPECIFICATION PROPOSED

The American Marine Standards Committee announces that proposed standard specifications for door bolts and catches and sash hardware for ships have been submitted to the membership and others concerned for ballot vote.

Proposed standards for mooring bitts, cleats, and posts for docks have been submitted to the technical committee on port facilities. A proposed revised marine standard specification for unlined linen fire hose has been submitted to the technical committee on ship operation details and supplies. The purpose of the revision is to harmonize the marine standard specification with the present requirements of the Underwriters' Laboratories.

REVISED BRITISH SPECIFICATION FOR COPPER WIRE

A revision of specification No. 128, Copper Wire for Electrical Machinery, has just been issued by the British Engineering Standards Association. It is intended to meet the needs of users of bare, annealed, high-conductivity copper wire for winding electrical machinery and apparatus. One of the principal differences between the new and the 1922 editions is that the tolerances permitted on the resistivity of the copper and on the diameter of the wire are smaller in the new publication. Furthermore, the tables of sizes and resistances of wire have been entirely rearranged and remodeled.

STYLES OF TYPES TO BE SELECTED BY PRINTING INDUSTRY

National Board Organized by Industry

A preliminary conference of representatives of manufacturers and distributors of type faces and members of the National Board on Printing Type Faces was held at the United States Department of Commerce, on Monday, March 3, 1930. This meeting was called by the division of simplified practice of the National Bureau of Standards, at the request of the National Board on Printing Type Faces, for the purpose of discussing the possibilities for the application of the principles of simplification to type faces for book, newspaper, magazine, and advertising purposes.

Objectives of the national board.

At the morning session of the conference members of the National Board on Printing Type Faces were asked to explain to the typefounders the aims and objectives of the board. The chairman of the board, E. M. Diamant, directed attention to the resolution which was adopted at the National Convention of the Advertising Typographers of America, held in Washington, D. C., September 17, 1929, that "a national board be organized whose function it shall be to pass judgment on all new type faces offered from either domestic or foreign sources, and to recommend such faces as are, in their judgment, of value to the art of typography and the science of advertising."

The board requested the cooperation of the typefounders in working out a plan whereby the problems that have arisen through the introduction of excessive and uneconomic diversity in type faces might be corrected and a proper medium for a scientific, sensible, and fair solution from a practical standpoint might be established.

A short meeting of the representatives of type manufacturers was held, but no definite action was taken, due to the absence of representatives of other important producers. Those present indicated their willingness to cooperate as far as it was deemed expedient.

Legibility determining factor.

The afternoon meeting was given over very largely to a discussion of the proper procedure to arrive at a satisfactory solution of the problem. Henry D. Hubbard, assistant to the Director of the Bureau of Standards, briefly discussed the subject of legibility as the determining factor in all printing, the point being made that while distinctive or special type faces are interesting and valuable in attracting attention of the readers, legibility is essential to hold the attention and get the message over to the reader. W. E. Braithwaite, of the division of simplified practice, briefly described the cooperative services and procedure of the division. It was pointed out that the principal help rendered by the division is in coordinating the preliminary work in securing general adoption of a simplification program, and in securing sustained adherence. It was emphasized that simplification programs must originate within the industry concerned. It was also made clear that the Department of Commerce can not support any simplified practice recommendation which does not have the approval of the majority of those concerned.

It was the consensus of opinion that another joint meeting should be held in New York City in the near future to crystallize opinions into action if possible. The date of the proposed meeting will be announced later.

GUARANTEE LABELS TO IDENTIFY SILK QUALITY

A New Grade of Wash Silk to Be Manufactured Under Approved Standards and Marketed with Quality Labels

Manufactured according to approved standard specifications, and sold on self-identifying quality-guaranteeing labels, a new wash silk, called "Lavelle," sponsored by the Spun Silk Research Committee of the Silk Association of America, has been placed on the market. The history of events preceding the promulgation of this standardization program would apply to practically every branch of the textile industry, including cotton, rayon, wool, and silk, states J. Ralph Corbett, executive director of the Spun Silk Research Committee, in pointing out that it is the same debasement program—the deterioration of quality resulting in loss of public confidence—which

prompted the committee to adopt minimum standards for inexpensive wash silks.

The editor of *Dry Goods Economist*, in discussing the subject says, "It is hoped that the precedent set by the Spun Silk Research Committee will be followed by the rest of the silk industry as well as by the manufacturers and converters of rayon and cotton fabrics. The establishment of minimum quality standards in all branches of the industry is eminently desirable for protection of both the trade and the public."

The name "Lavelle" has been chosen and registered in the United States Patent Office as a trade-mark identifying fabrics made in accordance with the committee's minimum standards. An identification tag has been prepared for distribution to silk weavers and converters producing cloths conforming to these standards. This tag will be affixed to silk piece goods sold across the counter and will be attached to garments made by manufacturers using these fabrics.

BUILDING CODES AFFECT USE OF MATERIALS

Extent to Which Materials May Be Used in Construction Dependent on Local Requirements

By GEORGE N. THOMPSON, *Bureau of Standards*

A group of men is gathered around a table. Rolls of blue prints and pages of figures are spread out. The business of passing upon tentative plans for a building is under consideration.

One director from out of town asks a question; Why can't we build six stories higher and derive revenue from renting the upper stories? Someone responds that the building code forbids it. A little later several alternative types of construction come up. The architect explains that with one material such and such conditions must be met, with another, different conditions. Why? Again the building code. Before the meeting is over it develops that the choice of structural materials, of fireproofing, of stairway widths, of elevator equipment, of story height, and of a great many other details, has been influenced by the provisions of the same document.

If one of these busy men paused to inquire about the building code he would very likely meet with some interesting facts. It would be emphasized to him that the code exists to protect the public against the acts of the ignorant, the incompetent, and the unscrupulous. Buildings have been known to fall down, devastating fires have occurred, disease has gained a foothold in places where no formal control of construction has been in effect. Out of such experiences have come laws and ordinances designed to protect the public. With the passage of time these have become more and more complicated as attempts have been made to keep in step with changing conditions and methods of construction.

Fifty-six codes reported.

The inquiring citizen might learn some curious and even startling facts about the code of his own municipality. It might be one of the 56 that are reported as not having had a general overhauling in the last 20 years. Thinking back over the changes in his own business and what he had heard of engineering progress in that time he would begin to wonder if the restrictions that were being placed upon the use of

building materials were in accord with modern knowledge. If he went further and compared a given requirement with that in a near-by city he might find that the way in which a material could be used in one place was not at all the way in which it could be used in another.

Instances such as the one cited above are bringing about a growing appreciation of the influence of building codes upon commercial activities. It is true that standardization and simplification in building materials is doing much to solve the problems of manufacture and distribution. But these materials must be used if they are to be sold. To be used most effectively any legal restrictions as to how they shall enter into construction should be reasonable and uniformly applied. This state of affairs can only be brought through patience and understanding. In the last analysis it must be effected in the legislative halls of a thousand municipalities by public officials whose sworn duty it is to protect the public.

The high-pressure salesman and the advocate of getting things done on the cut and try principle have no place in the picture. Charred and mangled human flesh may be the outcome of misguided enthusiasm for getting immediate results. Yet the public is entitled to justifiable economies in the use of materials and common sense in the restriction of its building activities.

Bureau assists in work.

As its contribution toward more logical building requirements the Department of Commerce offers the basic research work done at the National Bureau of Standards and the recommendations of the building code committee. These now consist of five printed reports, together with a sixth report containing plumbing recommendations issued by its subcommittee on plumbing. The work is being prosecuted with the eventual object of providing a complete framework of minimum requirements suitable for general adoption.

CEDAR CLOSET LINING

Grade Standards for Product Should Benefit Householders

Aromatic red cedar has long been recognized as an efficacious retardant to the ravages of clothes moths. Unfortunately, however, some manufacturers of cedar products have traded on the credulity of the public and have taken advantage of their faith in the protection offered by cedar lumber against moth damage.

The more progressive manufacturers of cedar lining for clothes closets, who have large investments in the business and are looking to the future, are cognizant of conditions and extremely anxious to give the householder a lining that is really a protection for stored

clothes, and, furthermore, to show how such closets should be constructed for maximum service.

According to present information, only the heartwood, or darker portion of the cedar, contains the oil that is of value as a protection against moth damage, and in order to assure the buying public of good serviceable material, the manufacturers, through their trade group, known as the Aromatic Red Cedar Closet Lining Association, are advocating the establishment of grade standards for their product.

While the idea is in its infancy, it is safe to assume that some identifying label of quality will be applied when the material is of commercial standard grade. Such a label will be the contractors and homeowners' guide to an effective cedar-lined clothes closet.

CURRENT ACTIVITIES OF THE AMERICAN STANDARDS ASSOCIATION

Summary of Projects Covering Safety Code for Use, Care, and Protection of Abrasive Wheels; Use of Explosives in Coal Mines; Fuel Oil; Graphic Symbols Used for Electric Apparatus, Instruments, and Circuits; Cut and Ground Thread Taps; Slotted Head Proportions; and Milling Cutters

A revision of the 1926 edition of the American Standards Association code for the use, care, and protection of abrasive wheels is now being prepared, and it is expected that copies will be available for review in the near future. The revision is in the hands of the technical committee which prepared the original code.

Among the most important of the revisions considered by the committee is that permitting the use of steel castings in hoods over wheels operating faster than 7,000 peripheral feet per minute. The revisions are being based upon a large number of special tests made since the establishing of the original code. The sponsors for the code are; Grinding Wheel Manufacturers Association of the United States and Canada and the International Association of Industrial Accident Boards and Commission.

Use of explosives.

On the unanimous recommendation of the mining standardization correlating committee of the American Standards Association, the code of American Recommended Practice for the Use of Explosives in Bituminous Coal Mines, has been submitted to the association for approval as American recommended practice. The American Standards Association technical committee which prepared this code was organized in 1925 under the sponsorship of the Mine Inspector's Institute of America.

The code covers suitability of types of explosives and appliances for use in bituminous coal mines; handling and storing explosives on surface; transportation, handling, and storage underground; and methods and precautions for charging and firing, including inspection. Work on the code was originally started following the organization of the mining standardization correlating committee in 1924, at which time a correlating committee laid out a broad program of standardization of the safety requirements of mines in an effort to reduce the large number of serious accidents resulting from the lack of sufficient safe guards.

Fuel oil.

The standardization of fuel oils, authorized by the American Standards Association at its meeting on June 27, 1929, was initiated at a conference of representatives of interested organizations on January 16, in the New York headquarters of the American Petroleum Institute. At that time it was agreed that the scope of this committee's activity should be the preparation of specifications for fuel oil, including domestic, industrial, and Diesel fuels, and excluding oils with a flash point below approximately 100° F. Tag. closed cup, oil burned in wick burners, and oil for gas-making purposes.

Graphical symbols.

A report on graphical symbols used for electric apparatus, instruments, and circuits, has been issued

by the American Standards Association technical committee on this subject, for the purpose of obtaining criticism and suggestions prior to the submittal of the standard for approval by the association. The subgroup which prepared the report is part of the American Standards Association technical committee on scientific and engineering symbols and abbreviations, under the sponsorship of the American Association for the Advancement of Science, American Institute of Electrical Engineers, American Society of Civil Engineers, American Society of Mechanical Engineers, and the Society for the Promotion of Engineering Education.

The report, according to the introduction, comprises graphical symbols used for one line and complete diagrams of electric power apparatus, instruments, and relays, and system-connection diagrams. The symbols are limited to apparatus usually met with in electrical power engineering, such as major electrical equipment in power houses, substations, and transmission and distribution systems, and to system-wiring diagrams. They do not cover communication, railway, or other allied branches of electrical engineering.

Basic symbols which seem to have widespread use and application, and only such symbols (with few exceptions) are given. It is recognized that the symbols presented do not cover all types of equipment, but it is believed that with relatively small additions to the basic symbols the variations in practice can be accommodated. This is especially true of the complete diagram symbols for rotating apparatus and transformers where it seems impracticable to show all possible connections of parts. Symbols for industrial power and switchboard-control apparatus have been omitted, as wide divergence of opinion and practice has been found to exist. Where, also, a wide diversity of opinion was apparent concerning symbols that would probably not be in common use, such symbols have not been included in the list. An attempt was made to include only symbols that are simple in design in order to facilitate rapid drafting.

In practice, notes in abbreviated form are often inscribed adjacent to the symbol figure. These notes give further information concerning the characteristics of the apparatus. A suggested list of such supplemental descriptive data under the subheading "Optional Notes" is given with certain symbols. Included in the report are symbols for power apparatus, symbols for instruments and relays, and general symbols for maps and connection diagrams.

Symbols for heat and thermodynamics.

A revised draft of the symbols for heat and thermodynamics has been submitted to the sponsors for approval prior to submittal to the American Standards Association. Work on this code was started with the organization of the subcommittee in April, 1926, and

the first tentative list of symbols was submitted a month later for consideration of the advisory committee on symbols of the International Electrotechnical Commission. Several new drafts were later prepared and circulated for criticism. In October, 1928, the subcommittee issued a revised draft in which was incorporated a list of symbols for heat transmission which had been compiled jointly with the committee on heat transmission of the National Research Council.

Further revision resulted in unanimous approval by the committee early in 1920. The report includes a statement of general principles dividing the use of symbols for heat and thermodynamics into general symbols; symbols for force, weight, work, and power; symbols for properties; symbols for general thermodynamics; symbols for the thermodynamic quantities; symbols for saturation, vaporization, etc.; and symbols for heat transmission.

Cut and ground thread taps.

A proposed American standard for cut and ground thread taps has been recently recommended by the National Machine Tool Builders Association, the Society of Automotive Engineers, and the American Society of Mechanical Engineers for approval and designation as an American standard.

This proposed standard covering machine screw taps, hand taps, taper taps, nut taps, and pulley taps, was developed by the general committee on the standardization of small tools and machine tool. The particular features of this new standard are as follows: Adoption of larger major diameters to allow for greater wear, increase in minimum pitch diameters on cut thread taps over three-fourths inch diameter to compensate for lead error, adoption of a comprehensive standard for ground thread taps, and stand-

ardization of a number of elements not heretofore covered. Numerous drafts of the proposed standard in preliminary form were distributed to industry for criticism and comment, and the present proposal is a revision of the earlier drafts in accordance with the suggestions received.

Slotted head proportions.

The development of an American standard for dimensions for slotted head proportions was undertaken by subcommittee No. 3 of the technical committee on bolt, nut, and rivet proportions in June, 1923. After wide distribution of the preliminary drafts, the proposed American standard was approved by the sponsors: American Society of Mechanical Engineers, National Machine Tool Builders Association, and the Society of Automotive Engineers, and has now been submitted to the American Standard Association for approval and designation as American standard.

Milling cutters.

The general committee on the standardization of small tools and machine tool elements recently approved the proposed dimensions for milling cutters developed by technical committee No. 5. Sections of this proposal cover the nomenclature, profile, and formed milling cutters and keys and keyways and give diameter, thickness, and other important dimensions. The proposed standard has been approved by the sponsors: American Society of Mechanical Engineers, Society of Automotive Engineers, and the National Machine Tool Builders Association, and is now formally submitted to the American Standard Association for approval and designation as an American standard.

PACKING METHODS AND MATERIALS STANDARDIZED

Norwegian Industries Standardize Containers for Shipping; State Railways Support Program

Packing methods and materials are being standardized throughout in the Norwegian agricultural, fishing, and market-gardening industries, according to a news account appearing in the Bulletin of the International Management Institute. The sawmills, wooden-case manufacturers, fishing, agricultural, and market-gardening industries, the import and export trade, Norwegian State railways, shippers' associations, coastal trade and steamer associations, hotel and restaurant proprietors are represented on the different standardization committees.

Standard cases for packing fish have been adopted, while further standard containers are being worked out for eggs, fruits, and berries, vegetables and flowers, dairy products, honey, and preserved goods. Cheap jute sacks for cabbage, carrots, and potatoes are being designed, the rule for such standards being that the value of the container should not be more than 10 per cent of the value of the content.

In order to encourage the use of standardized containers and more particularly in order that the proposed standards for fruit containers should be tested,

the Norwegian State railways have announced that they are ready to carry fruit packed in standard containers at a low fixed charge for any distance.

ARCHITECTS DEVELOP STANDARD DOCUMENTS

Wider Use of Standard Forms Advocated by American Institute of Architects

The committee on contracts of the American Institute of Architects many years ago developed a series of contract forms, office forms, and related documents, which have done much to improve contract practice in the building industry, announces Frank C. Baldwin, secretary of the institute, noting that the various standard contract documents have stood the test of 15 years' use. The documents are now issued in a fourth edition and have the indorsement of many prominent national organizations.

The institute also announces a book for architects entitled "A Review of the Standard Documents," by William Stanley Parker, past secretary of the institute. The book has been approved by the institute's committee on contracts, and also by its board of directors.

NAILED WOODEN OIL-WELL DERRICKS

Tentative Standards Adopted by the American Petroleum Institute

A report, including recommended standards for nailed wooden oil-well derricks, and a brief explanation of the method for computing their strength was recently submitted by the subcommittee on lumber specifications of the American Petroleum Institute.

This committee, appointed in December, 1927, was instructed to prepare specifications for a standard lumber derrick and recommendations for the use of lumber for oil-industry purposes generally. Investigation developed the fact that no sound basis existed for computing the safe load-bearing capacity of such derricks, which led to a program of tests on full-sized leg sections of customary types.

The results of part of these tests and tentative standards for lumber derricks were incorporated in a progress report submitted December, 1928. The tests were subsequently completed and the results interpreted by the United States Forest Products Laboratory. The method provided for computing the safe load capacity is based on the laboratory's recommendations and represents the only substantial change in the report of December, 1928.

CZECHOSLOVAKIAN BUREAU FOR CENTRAL RATIONALIZATION

Manufacturers of wooden flooring in Czechoslovakia have agreed to open a central rationalization bureau, according to an account appearing in the Bulletin of the International Management Institute. Standard measurements are to be fixed for wooden flooring, while the raw materials used are likewise to be standardized in regard to quality.

This will enable the manufacturers to receive better returns from capital invested in machinery and out of their plant as a whole, and to reduce transport and administrative costs. An executive committee has been appointed, and measures taken to insure that work should begin in the near future. All of the leading manufacturers of wooden flooring in Czechoslovakia have agreed to support the bureau.

STANDARD INSULATOR TESTS

A sectional committee on power-line insulators for voltages exceeding 750, sponsored jointly by the National Electrical Manufacturers Association and the American Institute of Electrical Engineers, and organized in accordance with the procedure of the American Standards Association, has just completed the development of a proposed standard for insulator tests and ratings, according to the Journal of the American Institute of Electrical Engineers. This standard, which is in the nature of a revision of American Institute of Electrical Engineers Standard No. 41, Insulator Test Specifications, has had the unanimous approval of the sectional committee and is now before the joint sponsors for action.

SUGGESTED NATIONAL STANDARDIZATION OF EMPLOYMENT REQUIREMENTS

Plans for Coordinated Research on Selection and Placement Procedure

A program for pooling the resources of Government, industries, and schools in such a way as to determine employment standards of the country at large, and to direct thousands of prospective employees to positions in industry or Government, which they are actually qualified to fill, was outlined by Dr. L. J. O'Rourke, director of personnel research of the United States Civil Service Commission, who, in speaking before the American Educational Research Association in Atlantic City, on February 22, 1930, announced extensive plans for coordinating educational, industrial, and governmental research to improve selection and placement procedure.

The project involves the standardization of Federal civil-service tests in schools and industries throughout the country, the purpose being to provide a common denominator for the evaluation of employment standards of firms or classes of firms, as well as of Government, according to Doctor O'Rourke. These tests, which are now being subjected to rigid statistical analysis, will be given to groups of typical employees in the firms cooperating in the project. The results, he stated, will show the standards of those firms, and each employer will be able to determine the ability of his personnel as compared with the ability of employees in similar organizations.

NEW SAWING SYSTEM PROFITABLY CONVERTS SMALL LOGS TO LUMBER

Millions of feet of top logs and small timber heretofore left on the ground in the woods may now be profitably converted into lumber, as a result of the successful introduction of the Scandinavian gang sawing system into this country by the National Committee on Wood Utilization of the Department of Commerce.

Supplementing a brief report on tests of this sawing system in a Pacific coast mill, issued in October, the committee recently released a printed bulletin which explains in detail the experiments and findings resulting therefrom. It may be obtained from district offices of the Department of Commerce, located in the principal cities, or from the Superintendent of Documents, Government Printing Office, Washington, D. C., at a cost of 10 cents per copy.

SIMPLIFICATION RECOMMENDATIONS REAFFIRMED BY INDUSTRY

The Bureau of Standards, through its division of simplified practice, has announced the successful completion of simplified practice recommendations for industrial truck tires, hospital plumbing fixtures, colors for school furniture, elastic shoe goring, and restaurant guest checks.

Sufficient signed acceptances have been obtained from the manufacturers, distributors, and users of each of these products to insure the general adoption

of the programs. These recommendations, which are now in effect, resulted from the cooperation of the members of the various industries concerned to eliminate those varieties and sizes which were not in sufficient demand to warrant their retention as regular stock items.

ACCELERATED WEATHERING TESTS FOR SPAR VARNISH

Gives Results of Experiments to Determine Durability of Varnishes

So much time is required to get results on the durability of varnishes from outdoor exposures that the National Bureau of Standards has devised accelerated weathering tests for use in the laboratory. These accelerated tests use in varying proportions the carbon-arc light, water, and refrigeration.

Fifty commercial spar varnishes, representing the products of different manufacturers, and some experimental varnishes made in the laboratory, were exposed to several accelerated weathering cycles and also outdoors, at two different seasons—winter and spring. The Kauri reduction test described in Federal Specification No. 18b, which is considered a measure of the elasticity of a varnish film, was made on all of the varnishes. They were also tested as to conformity to all the requirements of this specification for spar varnish. The varnish was applied on metal panels by two methods—whirling and brushing. Both sand-blasted and nonsand-blasted panels were used.

The bureau has just published a report which correlated the results of these tests, comparing the results of the accelerated weathering test and the Kauri reduction values with outdoor exposure. The relation is also shown between the results of tests as to conformity with Federal Specification No. 18b and outdoor exposures.

BAGGAGE SIMPLIFICATION

Survey Conducted to Ascertain Varieties Now Produced

Recognizing the commercial value of establishing standard sizes for trunks, a simplified practice committee was appointed by the Trunk, Luggage & Leather Goods Manufacturers (Inc.) to study the problem of excessive variety in sizes.

The committee made a thorough investigation of the sizes necessary to meet public needs, having in mind the economies that will be effected to merchants in continually carrying a complete stock at a minimum investment, as well as the advantage that will accrue to manufacturers in reduced number of models and standardization of parts. The chairman of the committee on simplification has submitted to the division of simplified practice a tentative recommendation for simplification of sizes of wardrobe, dress, and steamer trunks, hand trunks (tray style), and hand trunks (wardrobe style). The division has forwarded a copy of the proposed recommendation to manufacturers of trunks for approval or comment.

A questionnaire form has also been sent with the recommendation for use in reporting the various sizes of trunks which each manufacturer makes. The data

thus furnished will be consolidated to show the variety in sizes now being produced throughout the industry. The results of this variety survey will be used as the basis for a subsequent general conference to be held under the cooperative auspices of the division of simplified practice.

ADHERENCE TO SIMPLIFIED PRACTICE

High Adherence for Recommendations Disclosed by Surveys Made in Connection with Reaffirmation of Programs

The following simplified practice recommendations, No. 12, hollow building tile; No. 2, bedsteads, springs, and mattresses; No. 66, automobile brake lining; No. 67, roller bearings; No. 73, 1-piece porcelain insulators; and No. 76, ash handles, have been reaffirmed without change by their respective standing committees for another year. The recommendation for bedsteads, springs, and mattresses was reaffirmed for a period of two years.

Surveys of production to determine the degree of adherence accorded these recommendations disclosed that approximately 91 per cent of bedsteads, springs, and mattresses; approximately 89 per cent of hollow building tile and ash handles; 78 per cent of automobile brake lining; 58 per cent of roller bearings; and 91 per cent of 1-piece porcelain insulators, production conformed to the simplified schedule.

DIMENSIONS OF HOLLOW MASONRY BUILDING UNITS

A. S. T. M. Committee on Clay Units Expands to Include Concrete Units

The American Society for Testing Materials committee on hollow masonry building units has expanded the scope of its work to include the preparation of standards for concrete masonry building units.

Heretofore the activities of this committee have been confined to development of specifications and methods of test and definitions of terms for hollow burned-clay tile. The personnel of the committee has been appropriately expanded to include producers and users of hollow concrete units. A new subcommittee on concrete masonry units has been formed.

A new subcommittee on dimensions of hollow masonry building units has been organized. The function of this subcommittee is to bring about correlation between the sizes of masonry units and of masonry openings, so that all will fit together with proper bond and little or no cutting. The present standards for such products as bricks, hollow tile, concrete blocks, door frames, and window frames have been established separately and usually without consideration as to how the various products might be combined in the structure.

The development of standards in masonry openings is believed to be most desirable, but it has been pointed out that the producers of masonry building units should first adopt standards for their products. The new subcommittee will cooperate with other committees of the American Society for Testing Materials in a comprehensive study of the relation between sizes of building units and masonry openings.

WEIGHTS AND MEASURES REPORT RELEASED

Bureau of Standards Issues Report on Twenty-second National Conference on Weights and Measures

Miscellaneous Publication No. 101, of the National Bureau of Standards, which has just been released, is a full report of the proceedings of the Twenty-second National Conference on Weights and Measures, held in Washington, June 4 to 7, 1929. The conference is held annually, being attended by State and local weights and measures officials, manufacturers of weighing and measuring devices, representatives of industry, and others interested. There was an attendance of 220 at the meeting reported, including weights and measures officials from 25 States and the District of Columbia.

The conference adopted a number of amendments to codes of specifications and tolerances for commercial weighing and measuring devices which had been previously acted upon. Final action was taken in adopting specifications and tolerances on grease-measuring devices, the code on this subject having been tentatively adopted last year.

Copies of the complete report, which is illustrated, may be obtained from the Superintendent of Documents, Government Printing Office, Washington, D. C., at 30 cents each.

CEMENT SPECIFICATIONS

A. S. T. M. Announces New Tentative Specifications for High-Early-Strength Portland Cement

New tentative specifications for high-early-strength Portland cement have recently been issued by the American Society for Testing Materials on the recommendation of its committee on cement. The specifications were promulgated under the new procedure of the American Society for Testing Materials for receiving tentative specifications in the interval between annual meetings, through its committee on standards. The specifications were issued as tentative on February 18, 1930.

The report of the committee transmitting the specifications also embodied a number of proposed changes in the present standard specifications for Portland cement. The changes are: Minimum tensile strength at 7 days from 225 pounds per square inch to 275 pounds per square inch and the minimum tensile strength at 28 days from 325 pounds per square inch to 350 pounds per square inch. The committee believes these increased requirements are justified by the generally higher strength of American Portland cements.

With the inauguration of the work of the Cement Reference Laboratory, a lack of information concerning the tolerances on weights and dimensions of apparatus used in testing cement became apparent. To assist the reference laboratory in its inspection work, the committee has prepared a set of tolerances concerning new and used cement testing apparatus to be inserted in the standard specifications. These tolerances are also given in the report of the committee, and it is expected that they will be recommended at the annual meeting of the society in June for adoption.

SPECIFICATIONS FOR PLASTERING

Joint Committee Appointed to Write Specifications for Plastering

To write specifications for plastering, a sectional committee of the American Standards Association has been organized. The sponsors of this movement are the American Institute of Architects and the American Society for Testing Materials.

It is intended that this committee shall develop specifications for lime, gypsum, and cement plastering. Membership will include representatives of the producers of plastering materials, the producers of materials to which plasters are applied, and representatives of consumer interests and those responsible for the execution of the work. Four subcommittees have been appointed—on lime plastering, on gypsum plastering, on cement plastering, and on metal lath. There is, in addition, to be a coordinating committee which will receive the reports of the other committees and incorporate these into complete specifications for plastering. The coordinating committee will include in its personnel members of the subcommittees as well as architects, specification writers, contractors, and representatives of labor unions.

The subcommittees have been instructed to have complete specifications available not later than July 1, 1930. They have also been instructed to keep in intimate touch with the industry throughout the country, so that the specifications when developed will have nation-wide application.

MANAGEMENT CONGRESS

Discusses Standards for Materials Handling

"Organizing for permanent prosperity," was the keynote of the Management Congress and Materials Handling meeting held in Chicago, the week of March 3, 1930. All technical sessions were well attended, with most of them marked by active discussion.

Among many papers presented to the congress dealing with waste, the one by C. B. Auel on An Effective Method of Reducing Waste received marked attention. "The producer of waste," he said, "is usually his own best customer, and only after investigation has proven he can not make use of it in some way should effort then be made to dispose of it to outside parties. Further, the fact that markets for so many kinds of waste have already been found is proof that the material wastes of one concern are or can usually be made the raw materials of another. This being so, it is a matter of endeavoring to find two concerns and bring them together, one producing the waste as a by-product, and the other capable of using it to the best advantage, when solutions for many perplexing problems of waste disposition are at hand."

During the meeting on materials handling the question of "standardization in the materials handling field" was discussed. The subject will be continued at the annual meeting of the American Society of Mechanical Engineers in December, 1930, and at that time a report will be presented on an analysis of the need of standardization in this field.

UNIFORMITY IN TRAFFIC CONTROL

Standardized Regulation Advocated in Report to National Conference on Street and Highway Safety

Increasing density in automobile travel in the United States is making uniformity and standardization of traffic laws and ordinances a greater necessity than at any time in the past, it was announced by the Committee on Uniform Traffic Regulations of the National Conference on Street and Highway Safety which met, March 14, at the United States Chamber of Commerce to consider questions of uniform regulation.

The national conference is an advisory body created by President Hoover in 1924, while Secretary of Commerce, and is now under the chairmanship of Secretary of Commerce, Robert P. Lamont.

Submit recommendations to conference.

Recommendations of the committee, based upon a thorough and careful consideration of the subject of State and municipal statutory regulations, it was announced, will be submitted to the third national conference on street and highway safety which has been called by Secretary Lamont to meet in Washington at the end of May.

The committee emphatically declared for the utmost practical uniformity in both State laws and the traffic regulations of towns and cities. It was pointed out that the approaching tourist season will increase measurably the number of out-of-State cars in all communities.

The problem of congestion and the necessity for active effort on the part of all communities to reduce the hazards of accidents and fatalities, the committee believes, has put forward the question of uniformity of statutory and regulatory enactments as one of prime importance before the country.

In discussing the work already accomplished in this direction, Col. A. B. Barber, director of the conference, pointed out to the committee that the recommendations toward uniformity as found in the uniform motor vehicle code and the model traffic ordinance advocated by the conference for the last six years have accomplished far-reaching results, and that even where the measures have not been adopted in their entirety, many provisions and features of them are in force in a large proportion of the States and cities of the country.

"The need is to make the uniformity more comprehensive," Colonel Barber declared. "The question is one of the most pressing in the field of traffic handling, and with probably a keener public interest attached to it at this time than at any other period in recent years."

During much of the day the committee engaged in a discussion of speed limits by fixed statutory regula-

tion. Some of the members of the committee expressed the belief that the speed limit should be that which is safe and reasonable under traffic and highway conditions, while other members of the committee declared that a fixed maximum speed limit is necessary under existing conditions.

Courtesy necessary requisite.

Dr. H. C. Dickinson, chief of the heat and power division of the Bureau of Standards, a member of the committee, pointed out that "no regulation works perfectly in congestion. The man at the wheel must look out for the other fellow. Common courtesy is the most necessary requisite in safe use of the highways. Safe and careful driving is not limited by speed, but by existing conditions of the road and of the traffic at the time."

Capt. C. D. Farmer, of the State highway patrol of North Carolina, expressed the belief that a maximum speed limit is still an essential part of traffic regulation. "Until the examination and licensing of automobile drivers has become universal in this country, I do not feel that a maximum speed limit can be safely abandoned," he said. "We do not have a driver's license law in North Carolina. Any person, regardless of physical condition or ability, can drive an automobile in our State. That is true in other States as well. I feel that, until a driver's license is required in all States and provision is made for determining the physical fitness of an individual to handle the wheel of a car, the fixed maximum speed limit should not be abandoned."

Employ highway lanes.

The adoption of traffic lanes on cross-country roads of sufficient width to carry more than two lines of traffic came up for discussion. It was pointed out that with the widening of many existing highways there is adequate room for more than two lines of travel.

Prevailing tendencies of drivers, it was declared, is to gravitate toward the middle of the road, and in this way to reduce the use of the highway to a single line of traffic in each direction.

The suggestion was made that lanes of adequate width should be marked on such highways, either by continuous lines or by placing "mushroom" tacks at given intervals along the highway.

Employment of lanes, in the opinion of many members of the committee, would serve the purpose of relieving traffic congestion on many heavily traveled highways.

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· 1930 ·

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- VI. Municipal, county, and State agencies.
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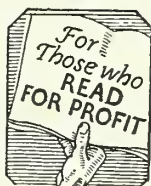
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